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Development of a New Management Information System for Lehigh University Small Business Development Center

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ABSTRACT

This thesis shows the step-by-step process of initiating and developing a management information system. It emphasizes the importance of involving prospective users in constructing a data base, as well as having a methodology to aid in developing the conceptual framework for the data base model.

This thesis documents the development of a new MIS system based on the following seven-step procedure: (1) preliminary investigation, (2) determination of system requirements, (3) cost and benefit analysis of the proposed system, (4) relational concept for the design process, (5) design of system, (6) development of software, and (7) systems testing, implementation and security.

Development of a New Management Information System for Lehigh University Small Business Development Center (SBDC)

CHAPTER 1

PRELIMINARY INVESTIGATION

As a part of the Pennsylvania Small Business Development Centers, Lehigh University SBDC provides free management counseling to entrepreneurs and small firms. It currently serves approximately 1000 clients per year and is one of the largest centers in Pennsylvania.

Lehigh SBDC currently has two computerized data base systems and one manual system. The first computerized data base is based on a mainframe computer, while the other one was developed on a microcomputer. These data bases, each with their unique problems, have created some redundancy in input operations. The objective of this chapter is to investigate these redundancy problems, and also contemplate the development of a new MIS system.

I. The DEC 20 System

In 1982, the first management information system for the Lehigh SBDC was designed and implemented. This was also the first system developed for an SBDC in Pennsylvania. The system uses DBMS software on DEC 20. Although the design of the system was based on accurate system development methodology, there exist two rather

technical and significant problems with the DEC 20 system.

1. **Edition and deletion problems.** It does not have a full-screen editing capabilities, i.e., for edition and deletion one has to go through several loops which is a time-consuming effort.
2. **Unavailability.** It is frequently taken out of service for repairs and upgrading. Also, if the system crashes during a data-entry session, all input data for that session will be lost. In addition, DEC 20 is soon expected to be replaced with another mainframe computer.

A sample execution of of several application programs and other documentation are in Appendix F.

As the use of microcomputers became popular, several SBDCs started experimenting with the development of a PC-based data base. In this regard, the SBDC in Pittsburgh was perceived to be ahead of other centers in Pennsylvania. The University of Pittsburgh SBDC initiated the development of a new system using KnowledgeMan software.

II. KnowledgeMan SBDC Database Manager

"The SBDC Database Manager is a menu driven data base management application that was created to aid the

Pennsylvania Small Business Development Centers in the generation and management of their case data forms (i.e. Form 1062 which is in Appendix A). In addition, the SBDC Database Management System possesses the capability to down load the individual center databases to a central site data base."[1]

A consultant was hired by the Pennsylvania SBDC Computer Committee to create the system using KnowledgeMan. After some amount of time (and a good deal of money) the system was presented for the SBDCs' use. An updated system was delivered in the beginning of 1986. The development process of this data base was completed without users' consultation and with limited input from individual SBDCs. This is clearly contrary to a good systems development practice.

Among the Lehigh University SBDC personnel, including management, business analysts, and secretarial workers, there have been a variety of complaints. The following is a list of most common problems that SBDC was encountered:

1. **The implementation is not complete.** Management information and reports are not easily and quickly obtainable. The user must be familiar with KnowledgeMan's command structure and with

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[1] This is according to the SBDC Database Manager documentation.

the intricacies of the fields in the files of the SBDC Data base in order to obtain information using the "Ad Hoc Inquiry" option of the main menu.

2. **The implementation is not efficient.** As the data base is not "normalized", more data must be entered than is unique and necessary. For example, the location code and SBDC code must be entered for each case. Furthermore, the counselor name must be entered despite the fact that each counselor has a unique number. A logical solution might have been to normalize the data base and use the relational power of KnowledgeMan to automatically determine these items when necessary. Perhaps the worst example of inefficiency is in the use of a 750 byte "comments" field for each contact. This is over 14 times greater than the rest of the data in that file. While this is a concern regarding the use of storage space, the greatest impact is in generating management information about the contacts. Data retrieval from physical storage, which is inherently the bottle-neck in information generation, takes 14 times longer because all fields are included in the same file. This

field, if deemed necessary, could have been placed in a file by itself.

The situation is aggravated by the fact that the Lehigh University SBDC carries a client load that is a good deal heavier than other SBDCs.

3. **The implementation is unreliable.** Recently, the SBDC began experiencing a situation where the system "hangs up" ("freezes" or becomes "inactive") frequently and the computer must be "rebooted" (essentially "restarted"). The data that has been entered in the current session is lost, although, data entered during previous sessions apparently has not been affected. The fact that the problem recurs at the same point in the program leads one to believe that it is a software problem.

4. **The implementation is not modifiable.** The programs were received in compiled form. This means that individual SBDC's may not customize the system for their own internal reporting, and neither can the above mentioned software problems be rectified. This has lead the SBDC to continue to use the mainframe computer program for all internal information and report generation and

has necessitated "double entry" of all client and case data.

These problems are not inherent in KnowledgeMan. The data base program has been widely reviewed and widely acclaimed for its power and user interface. The problems apparently lie in the current implementation of the system. The documentation of the KnowledgeMan system is in Appendix G.

Under regulations and directives of the Pennsylvania SBDCs Director Office, the Lehigh University SBDC is obliged to use this system despite all its problem. In the meanwhile, we have to find a solution to the data need of the SBDC.

III. The Manual System

Inflexibility of the DEC 20 system for editing, search, and retrieval of information, combined with difficulties and problems in using KnowledgeMan, created a need for yet another system: a manual system. This manual system is being used by the secretaries to keep track of individuals who contact the SBDC for information and counseling.

An examination of the documents and interviews with the staff clearly show how this system has been developed spontaneously by the secretaries to cover the deficiencies of the existing data base systems. They also reveal what should be the basis for an efficient data base system.

An individual, Roberta Carlson in this case, contacts the Center, a secretary writes her name , address, phone number, reason for contact, and the date of contact in a log book, i.e., the Log Book for New Contacts which is shown in Exhibit 1. Then, a cover letter along with the "Request for Counseling" (Appendix A) are mailed to her in an enveloped. Her name and address, therefore, are typed on both the cover letter, Exhibit 2, and on the envelope, Exhibit 3.

When the contact mails back the "Request for Counseling" , the secretary retrieves his/her name from the Log Book for New Contacts, writes the date that the form is received, and enters the contact name, address and phone number in another log book. This log book is called the Log Book for New Clients which is shown in Exhibit 4. This log book also contains two new pieces of information. After a consultant is assigned to the client, the consultant number as well as a case number are written in front of the client name.

EXHIBIT 1

Log Book for New Contacts

UNIVERSITY OF PENNSYLVANIA
SMALL BUSINESS DEVELOPMENT CENTER

Counseling Contact Log

Page 10 of ___ pages

Center Location: Temple University Month: August 1985

Contact # and Date	Name and Alternate	Firm and Address	Phone Number	Form of Contact	Referred by	Reason for Contact	Initial Referral	Disposition	Follow-Up Date
7/22	Linda Kauffman	700 Penn Ave W. Reading 19611	378 9253	P		Cash flow for new bus.	641	AUG 22 1985	8/28/85
8/22	Jerry VanCavage	1449 Salisbury Rd. Allen. 18103	797 7513	P			641	AUG 22 1985	8/26/85
7/22	Alice Marques	3938 Kenrick Rd. Zion 18017	865 2197	P	345 6577	(WS)	641	AUG 22 1985	8/26/85
7/22	Roberta Carlson	3135 Vermont St Easton 18042	201 859 7370	P	250 9246	start-up Custom tailoring	641	AUG 22 1985	8/26/85
8/23	Whisnant Telephone (Harold)	351 Grant St. Phillipsburg 08865	201 859 3951	P		farmer client	641	AUG 22 1985	8/28/85
7/23	Norman Zaltack	96 Locust Dr. Schnecksville 18078	694 1617	P		start-up printing	641	AUG 23 1985	
7/23	Daniel Scheirer	212 St Johns St Catasauqua 18032	264 8571	P		start-up self-insurance carwash	641	AUG 23 1985	8/26/85
7/26	Jerry Schmidt	3359 S. 2nd St Whitehall 18052	264 7308	P			641	AUG 26 1995	

EXHIBIT 2

The Cover Letter Sent to New Contacts

Lehigh University

Small Business Center
telephone (215) 861-3980

412 S. New St. 203
Bethlehem, Pennsylvania 18015

September 18, 1985

Ms. Roberta Carlson
3135 Vermont Street
Easton, PA 18042

Dear Ms. Carlson:

In response to your telephone inquiry, we are sending you information about SCORE, the Small Business Center and their services.

If you are interested in free counseling, please complete and sign the enclosed Request for Counseling, Form 641. Answer all the questions to the best of your knowledge and return it to me in the enclosed envelope. After we receive the completed form a counselor will contact you to arrange an appointment.

In addition, the Small Business Center maintains a library of resources helpful to anyone interested in starting or improving a small business. It includes many start-up manuals for specific businesses as well as general information on small business problems. The library is open to the public Monday through Friday, 8:15 a.m. to 4:45 p.m.

Sincerely yours,

Edith D. Ritter
Program Administrator

EDR/pd

Enclosures

EXHIBIT 3

The Envelope for the Cover Letter

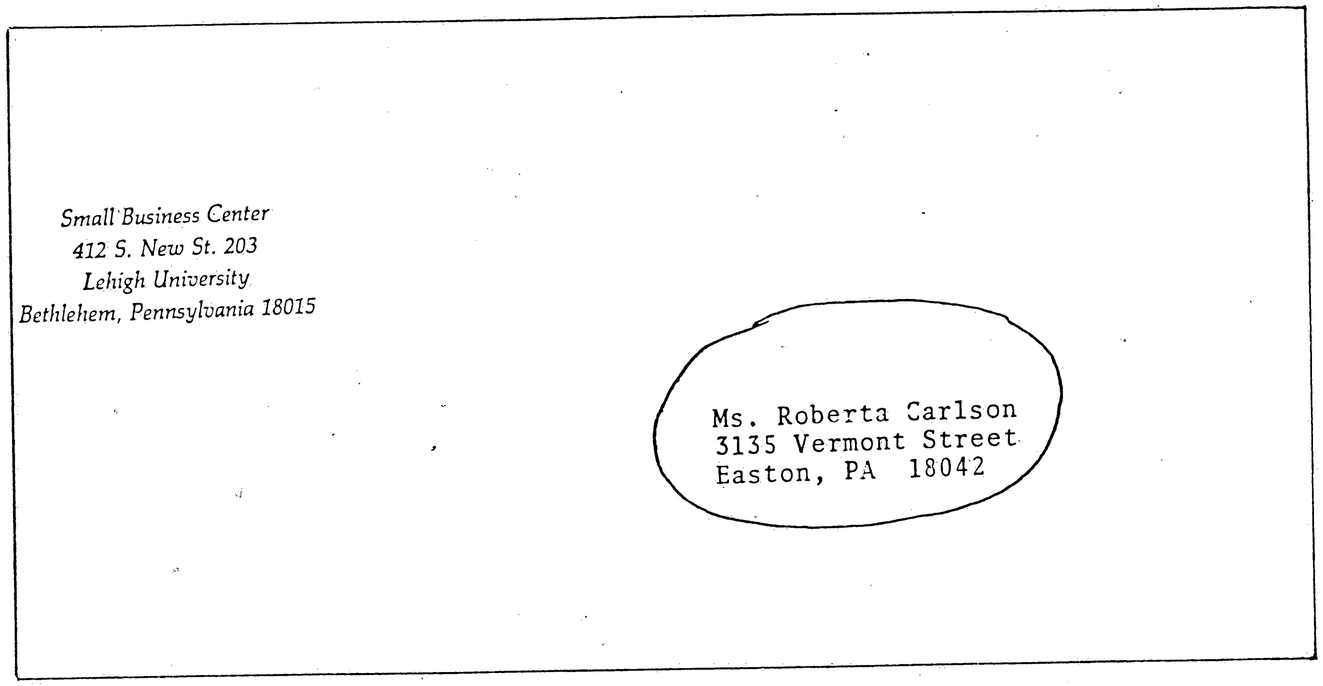

EXHIBIT 4

Log Book for New Clients

1					
2	8/22	Durham Products Box 123 Riegelsville, Pa. 18077 346-8083 Andy Hanzlik	35126	BA	MK E022
3					
4					
5					
6					
7	8/22	The Christian Contractors 734 Seitz St. Easton, Pa. 18042 258-1390 Harold Christian	35127	BA	~~Ta~~ ~~E018~~ TW E021
8					
9					
10					
11					
12					
13	8/22	4th St. Press 241 Cherokee Bethlehem, Pa. 18015 865-2930 Jeremy T. Monro	35128	BA	MEH E020
14					
15					
16					
17					
18					
19	8/26	Roberta J. Carlson 3135 Vermont St. Easton, Pa. 18042 250-9246	35129	BA	JTa. E018
20					
1					
22					
23					
24	8/26	Cline Data Systems Inc PO Box 273 Stateinkl Palm, Pa. 18070 679-8874 Gene Bonett	35130	PA	GM E023
25					
26					
27					
28					
29					
30	8/27	Judy Hagley RD#1 Box 873-2 Reading, Pa. 19607 775-9430	35131	BA	JTa. EC18
31					
32		[illegible] [illegible] Schiller St. Reading, Pa. 19601 [illegible]	35132	BA	JTa. EC18

EXHIBIT 5

The Index Card for the New Client

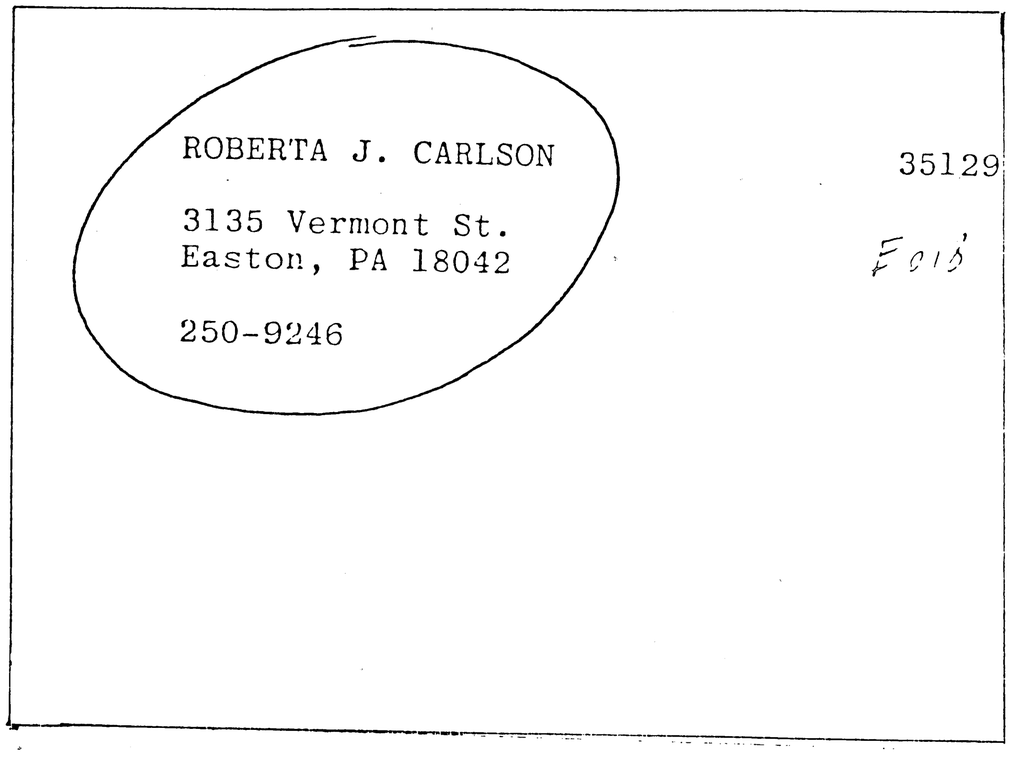

EXHIBIT 6

Entry of New Clients Information

to DEC 20

LOG BOOK FOR CASES 3126 TO 3132

DATE 09/16/95

PAGE 1

CASE #	CONTACT NAME	ADDRESS	TELEPHONE	CONSULTANT #
3126	HANZLIK ANDY	BOX 123 RIEGELSVILLE PA 18077	(215)346-8083	E022
3127	CHRISTIAN HAROLD	734 SEITZ ST. EASTON PA 18042	(215)258-1390	E021
3128	MONRO JEREMY	741 CHEROKEE ST. BETHLEHEM PA 18015	(215)865-2930	E020
3129	CARLSON ROBERTA	3135 VERMONT ST. EASTON PA 18042	(215)250-9246	E019
3130	BONETT GENE	PO BX 273 STAT.RD. PALM PA 18070	(215)679-8874	E023
3131	HAGLEY JUDY	RD#1 BOX 873B READING PA 19607	(215)775-9639	E018
3132	SHERIFF ALBERT	103 SCHILLER ST. READING PA 19601	(215)375-8053	E013

As shown is Exhibit 5, the client information, for the fifth time, is typed in an index card. Finally, as though this was not enough, the client´s name, address, and phone number are entered again by another secretary in both the DEC 20 and KnowledgeMan systems (see Ehibit 6).

IV. Reasons for Development of a New System

Given the above circumstances, there appears to be a need for development of a new MIS system with the following characteristics:

1. To reduce redundancy
2. To eliminate repetitive work
3. To be available at all times
4. To have full-screen editing capabilities
5. To process data, as well as, to retrieve information at a greater speed based on normalized database
6. To be reliable in terms of integrity and security of the data

This new system will replace both the manual and DEC 20 systems.

At the same time that both DEC 20 and KnowledgeMan systems have given the SBDC some system problems, several smaller projects have been successfully implemented using dBase II and dBase III software.

V. dBase III Selection

Since there apparently exists a need at many SBDCs to implement an efficient and modifiable MIS system without all the problems encountered in using the existing KnowledgeMan program, dBase III+ was selected as a substitute for the KnowledgeMan for the following reasons:

1. Prior successful experience with dBase III
2. Availability of dBase programmers at Lehigh
3. Flexibility of dBase III "memo" fields for commentaries
4. dBase III software is by far the market leader, and its accessories(including compilers) are readily available from third parties.

The new network phone system at Lehigh University also provides the Center with an opportunity to develop a network microcomputer-based MIS with multiple data entry points and multiple work stations. This system has been tested and the transfer of files can now be easily done over the new telephone systems.

VI. Development Process

The development of a new MIS system may be divided into 7 different tasks. These tasks are is outlined in the following chapters.

Chapter 1: **Preliminary Investigation.** This chapter investigates the problems with the existing systems and states reasons for developing a new MIS system.

Chapter 2: **Determination of System Requirements.** In this chapter, results of interviews and examination of sample documents provide the foundation for determining the basic requirements for the proposed system. Using data flow diagrams, systems requirements are determined and key variables and processes are identified.

CHAPTER 3: **Cost and Benefit Analysis of the Proposed System.**

This chapter develops a framework for making a decision with regard to the implementation of the proposed system.

CHAPTER 4: **Relational Concept for the Design Process.**

Chapter 4 carefully examines the process under which data base should be normalized. The end result of this process is the

development of the Third Normal Form of relationships among several groups of data elements. This is the first stage for a full-fledged system design.

Chapter 5: **Design of System.** Output design, input design, data files and data files processing design are discussed in this chapter.

Chapter 6: **Development of Software.** Programming and documentation are developed in three different stages: (i) data structures are created, (ii) data entry is programmed, and (iii) application programs are used.

Chapter 7: **Systems Testing, Implementation and Security.** This chapter focuses on using test data, debugging the program, and securing the data base.

Figure 1.1: Project Implementation Schedule

Development Process	Biweekly Schedule										
1. Preliminary Investigation	X	X									
2. Determination of Requirements		X									
3. Costs & Benefit Analysis			X								
4. Relational Concept				X	X						
5. System Design					X						
6. Software Development						X	X	X	X	X	
7. System Testing Implementation and Security										X	X

As shown in the Figure 1.1, total project life cycle was 22 weeks.

CHAPTER 2

DETERMINATION OF SYSTEM REQUIREMENTS

I. Data Flow Diagram

As represented in Figure 2.1, the SBDC counseling process starts when a business submits a "Request for Service" application. The secretary puts a copy of this application in the client file and passes it to a full-time staff (either Associate Administrator or SBDC Administrator). The full-time staff study the Request for Service. Depending on the type of request demanded and the availability of in-house expertise, a qualified consultant is assigned to the case. Consultants are chosen from 4 different resources: retired executives or SCORE (S), SBDC employees (E), outside consultants or Lehigh University faculty members (F), and Lehigh University students or LUMAC teams (G). The consultant number is then typed on the corner of the Request for Service.

The consultant then contacts the client and makes an appointment. Using market research materials in the library and opinions of other SBDC staff, the consultant make the necessary preparations for a successful meeting. All the activities with regard to the client and counseling process are recorded and a copy is kept in the client file for future reference.

Figure 2.1: Data Flow Diagram for Counselling Processing

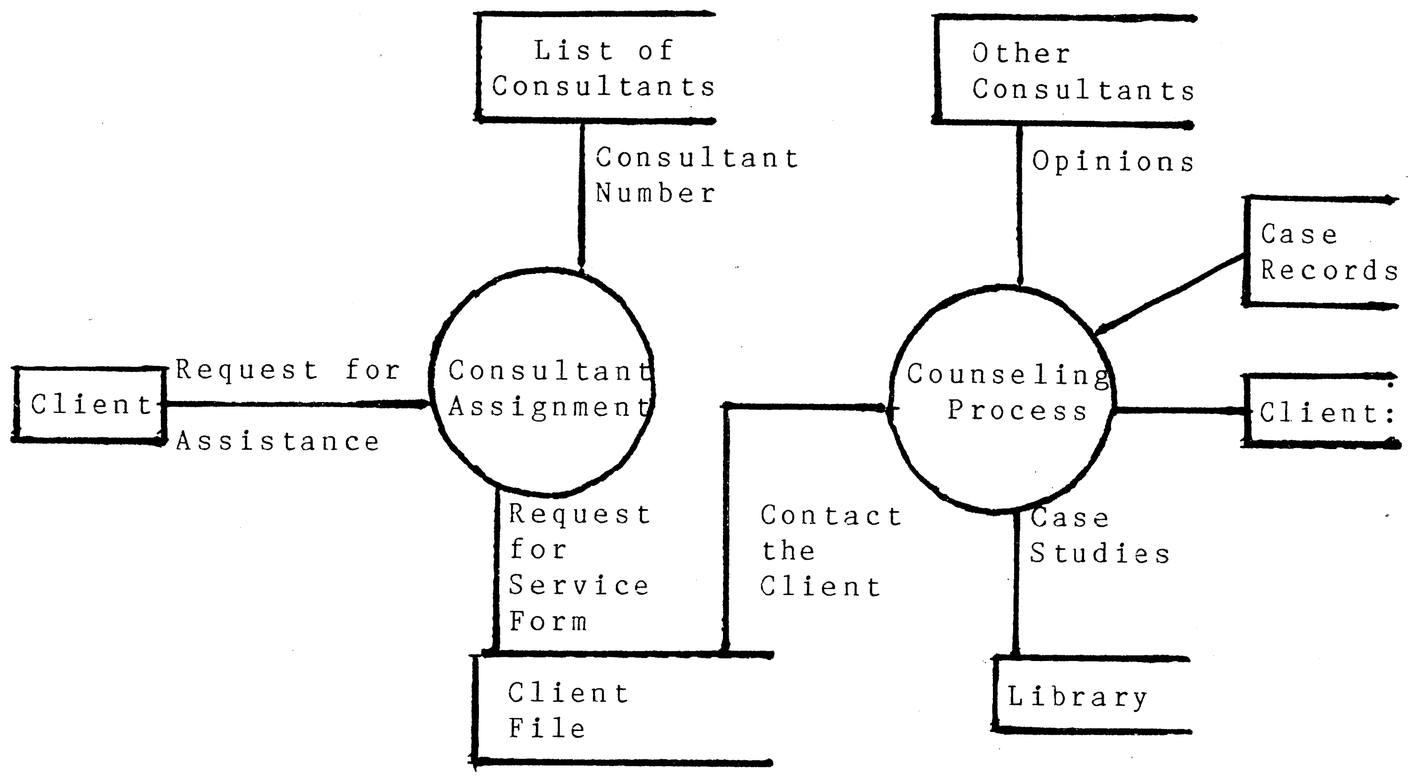

Figure 2.1 represents the data flow for the counseling procedure at Lehigh University SBDC.

Information about a case and its consultant are currently either recorded and processed manually or input to KnowledgeMan.

II. Basic Requirements: Management´s Views

A careful examination of the activities and documents in the SBDC and interviews with three staff revealed the following as the main requirements for the management of the Center.

1. Monitoring Consultants´ Work

To exert effective supervision over the activities of each consultant or a group of consultants, SBDC needs to develop reports on total number of cases assigned to a consultant for a given period of time.

2. Consultants´ Client Lists

Consultants should be aware of the status of their clients and their own activities. Two types of clients list are deemed to be necessary. The first list shows clients number and names. It is used by the consultant to keep track of their clients. The second report should list all clients for a specific consultant. It reports more detail information about a company such as contact name, address and phone number, type of business, and important consulting comments.

3. Mailing Labels

Mailing label generation for individual consultants or

a group of consultants should be included on a basic requirement. Mailing labels should be also prepared for specific group of clients such as those who are in the same line of businesses, or those operating a given geographical area (to more precisely target SBDC promotional materials and seminars).

4. Search Function

To keep track of about 1,000 cases and 30 consultants, the system should have the capability of searching for consultant information. If a client, contacts the SBDC for a second time, the secretary should be able to retrieve information pertaining to his case and refer him to his previous consultant . For that matter the consultant should be able to obtain information if he only remembers a case number or a contact name. Therefore, the system should be "inverted" (indexed) on most of its fields.

It becomes apparent that the basic requirements indicate a combined transaction-oriented and decision-support systems.

III. Basic Requirements: Secretaries´ Views

As discussed in Chapter 1, given the redundancy in the systems, both secretaries specifically requested that

the manual system be eliminated. Therefore, the proposed system should also have the following characteristics:

1. Reduce redundancy
2. Eliminate repetitive works
3. Be availability at all times
4. Have full-screen editing capabilities
5. Process data, as well as retrieve information at a greater speed based on normalized database
6. Be reliable in terms of integrity and security of the data
7. Be user friendly

CHAPTER 3

COSTS AND BENEFITS ANALYSIS

The majority of cost items in this project are direct expenses such as equipment and software. Major benefits such as improvement in productivity and efficiency are indirect. Major categories of costs and benefits are presented below.

I. Cost Categories

1. Equipment Cost

Two Zenith ZF159 (micro computer) each with one drive, color monitor, 640 RAM, and a 20MB hard disk are required from the new system. Each unit costs approximately $2,200. An additional expense will be incurred for purchase of a printer. A fast letter-quality printer is required by the management of the SBDC. After a careful search, C.Itoh F40 with such features as 40K buffer and 28 CPS was considered. This printer will cost $800. Another dot-matrix printer is required for printing mailing labels and long queries.

The second printer can be obtained at about $400.

2. Software Cost

dBase III+ software will cost about $400. A compiler such as Clipper will cost additional $400.

3. Project Development Costs

Two major costs associated to the development of this project are salaries paid to system analyst/project manager and programmer.

A. System Analyst/Project Manager

One of the staff at The SBDC will invest 20 percent of his time for a period of 22 weeks in this project. Associated salary and payroll expenses for this function are $2,500.

B. Programming Expenses

A total of 100 programming hours will be commissioned to a Lehigh University student at a cost of $2,000.

4. Training Costs

One month of training time is required for the secretary to learn the new system. Her salary for that month will cover both training costs and cost of lost efficiency because she has never worked with computers before. Total cost of training is about $1,200.

5. Supply Expenses

Supplies such as paper, ribbons and floppy disks will amount to $50 per month.

II. Benefits Categories

1. Reduction in Secretarial Time

A part-time secretarial position will be eliminated when the new system is implemented. Total salaries and payroll expenses for this part-time position are $8,000 per year.

2. Cost-avoidance Benefits

If a new MIS is not implemented, the SBDC (which has 30 consultants and 1,000 clients per year) must consider changing the position of the part-time secretary (mentioned above) to full-time. Total payroll expenses for a full-time secretary are $16,000. Therefore, additional cost of this change will be $8,000 per year.

3. Reduction in Computing Center Charges

Currently the SBDC is charged an average of $200 per month by the Lehigh University Computing Center for using Cyber and DEC 20 mainframe computers for printing, disk space, and processing. The new system will reduce these costs by 50% to approximately $100 per month.

4. Other Benefits

There are a number of other benefits which can not be quantified, but nevertheless, are important. Reduction in errors, providing quicker service to the SBDC clients, reduction in search time for locating a client's file are just a few examples of the kind of enhancement in efficiency and quality which could be achieved with the implementation of the new MIS systems.

III. Cash Flow Analysis

The following tables summarize the cost and benefit categories for the period of 1987 through 1991.

Table 3.1: Costs

Item	1987	1988	1989	1990	1991
Equipment Cost	$5,600	0	0	0	0
Software Cost	800	0	0	0	0
Project Development Cost	4,500	0	0	0	0
Training Cost	1,200	0	0	0	0
Supply Expense	600	600	600	600	600
Total Costs	12,600	600	600	600	600

Table 3.2: Benefits

Item	1987	1988	1989	1990	1991
Reduction in Secretarial Time	$8,000	$8,000	$8,000	$8,000	$8,000
Cost-avoidance Benefits	8,000	8,000	8,000	8,000	8,000
Reduction in Computing Charges	1,200	1,200	1,200	1,200	1,200
Total Benefits	17,200	17,200	17,200	17,200	17,200

Table 3.3: Net Cash Flow

Item	1987	1988	1989	1990	1991
Net Cash Inflow (Total Benefits)	$17,200	$17,200	$17,200	$17,200	$17,200
Net Cash outflow (Total Costs)	12,600	600	600	600	600
Net Cash Inflow	4,600	16,600	16,600	16,600	16,600

Table 3.3 indicates that the project will have less than one year pay-back period and the net cash inflow is positive for all the five years under consideration.

IV. Simple Payback Period

In the first year of the operation, the new system will generate total benefits of $17,200 and cost $12,600

which can be translated into a pay back period of less than one year (approximately 9 months). Since The payback period is rather attractive the project should be recommended for implementation.

CHAPTER 4

RELATIONAL CONCEPT FOR THE DESIGN PROCESS

The underlying model of the SBDC data base should be first viewed conceptually. This will help to systematically reveal the details of the data base design (which will be examined in subsequent chapters).

The major concept derived from the relational data model used in developing the conceptual model is the **normalization process**, that is the process of grouping the data elements into tables representing entities and their relationships. Normalization theory is based on the observation that a certain set of relations has better properties in an inserting, updating, and deleting environment than do other sets of relations containing the same data.[2]

The reason that we should use a normalizing procedure is to ensure that the conceptual model of the data base will work, i.e. not have any of the storage anomalies mentioned above.

I. Unnormalized Data Model

An unnormalized data model consists of records that are generated during the course of operation at the SBDC.

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[2] S. Atre, Data Base: Structured Techniques for Design, Performance, and Management, A Wiley-Interscience Publication, 1980, Page 130.

The purpose of this section is to show that the unnormalized data base structure does not work.

Table 4.1: Unnormalized Relation

Contact Name	Cont. No.	Cont. Add.	Date of Contact	Client Name	Case No.	Client Add.	Date Assigned	Consult. No.	Consult Name
Smith	1111	M St.	3/2/87	Smith	3753	M St.	3/8/87	E003	Mehdi
		M St.	5/3/87	Smith	6811	M St.	5/9/87	E002	Edie
		P St.	8/6/87	Smith	----	----	------	----	-----
Jones	1222	T St.	5/3/87	Jones	4550	T St.	5/9/87	E003	Mehdi

Consider the example in Table 4.1. The data elements or attributes are **contact name** (the name of a person who contacts the SBDC. At the design level, this name will expand to include both first and last names, position of the contact, and the name of the company), **contact number**, **contact address** (at a later stage this can be broken down to street address, state, zip code, telephone area code, telephone exchange number, telephone number, and extension), **date of contact**, **client name** (a contact who formally request a counseling service), **case number**, **client address**, **assigned date** (this is the date that a client is assigned to a consultant), **consultant name**, **consultant number.**

The above table represents an unnormalized relation. At the intersections of rows and columns more than one

value is present. It is not easy to identify a primary key. Assume that the primary key is the contact number. Given a value of the primary key, there are a number of columns; for example, for "contact number = 1111", there are a multiple values of the intersections with consultant number, date of contact, consultant name, and so on. This implies that, in this environment, for a given value of primary key, the values of the nonkey (non-primary key) attributes cannot be determined uniquely.

II. The First Step in Normalization of Data:

First Normal Form

The first step consists of transferring the data items into a two-dimensional table. All that is required is the removal of repeated occurrences of data items so that a flat file is obtained. Therefore, at every intersection of a row and a column there can be only one value in the table.

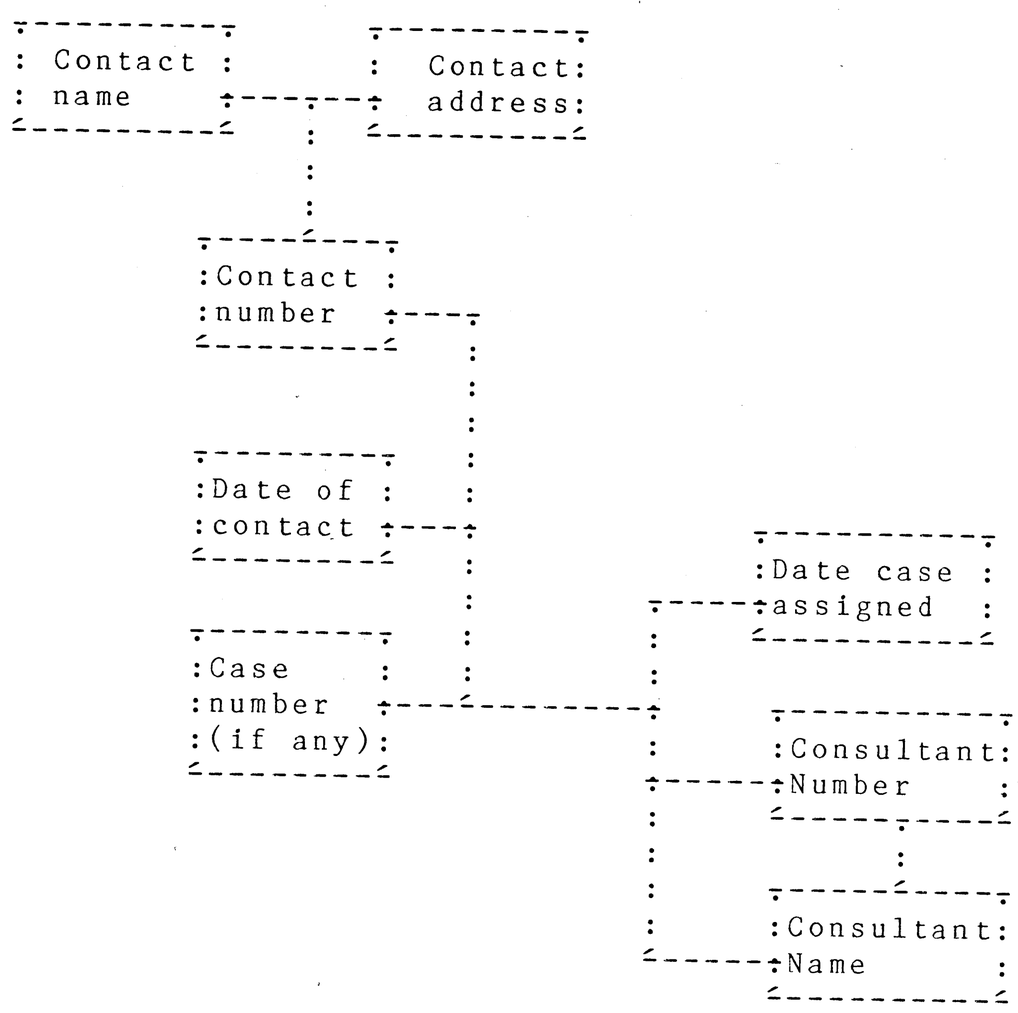
The unnormalized relation from Table 4.1 can be transferred to the relation in Table 4.2. In this transformation, the contact number, case number, contact name, and address are repeated.

Table 4.2: Normalized Relation: First Normal Form

Contact Name	Cont. No.	Cont. Add.	Date of Contact	Client Name	Case No.	Client Add.	Date Assigned	Consult. No.	Consult Name
Smith	1111	M St.	3/2/87	Smith	3753	M St.	3/8/87	E003	Mehdi
Smith	1111	M St.	5/3/87	Smith	6811	M St.	5/9/87	E002	Edie
Jones	1222	T St.	5/3/87	Jones	4550	T St.	5/9/87	E003	Mehdi

Table 4.2 represents a relation in the **first normal form.** When the values taken by the contact number and date of contact are known, the values taken by the case number (if any), date assigned and consultant information are also known. Likewise, if case number in known (when there is a client) all other variables are also known. The primary key is thus the combination of the contact number, date of contact, and case number. There are no other candidate keys for this relation. All the nonkey attributes in the relation are functionally dependent on the primary key. Figure 4.1 demonstrates this relation.

Figure 4.1 : First Normal Form Relation



Three forms of storage anomalies will result if we leave our data in the first normal form.

1. **Insertion Anomaly.** It is possible that a new contact does not turn into a new client. As a result, no information about the contact can be stored. For example "contact number=1111" which has a contact date of "8/6/87" in the unnormalized form can not be stored in the first normal.

If we separate contact number from case

number, together with contact name, in a different relation, this insertion anomaly will be rectified.

Another insertion anomaly could be created when a case is assigned to a new consultant who has not yet received a consultant number.

2. **Update Anomaly.** If a client contacts the SBDC for the third time, and if between the second and third visit he has moved, we would like to update his address in all the rows where he/she appears. This example shows that is it difficult to update a first normal form relation, because the number of rows where the changes has to be reflected is time-varying. The worst thing would be to have some rows with the old address and some with new one.

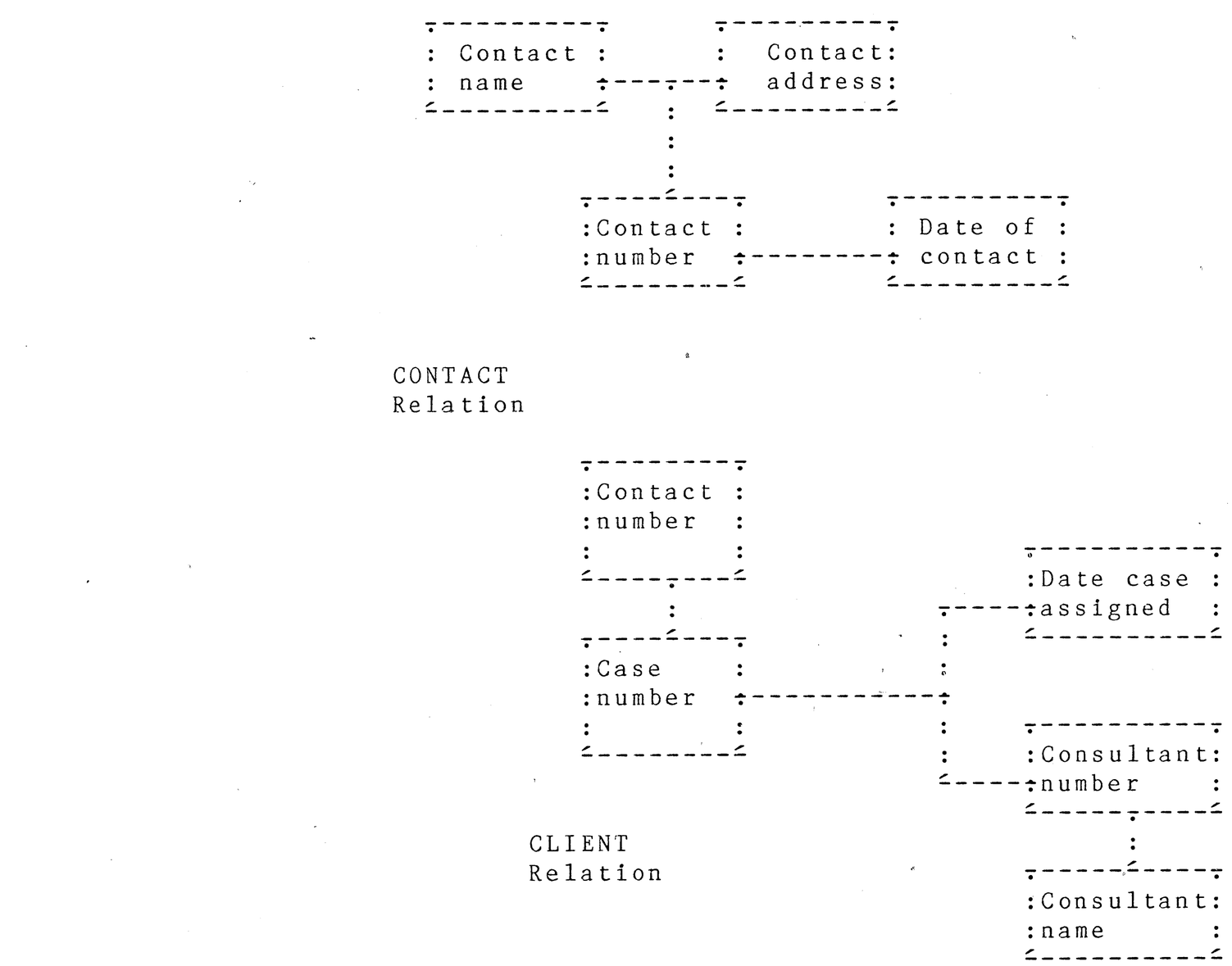
This update anomaly will be taken care of if address appears only once.

3. **Deletion Anomaly.** Suppose we wish to delete the information about a case after the client could not be reached by the consultant at the time. But when we delete the client row, all facts about the contact information will be lost.

III. Second Normal Form Relation

To take care of these anomalies, we will separate the contact information into a CONTACT relation, and the case information into a CLIENT relation, as in Figure 4.2.

Figure 4.2 : Two Second Normal Form Relations



In the second normal form, some of the anomalies have been removed.

1. **Insertion.** We can enter a new contact who has not received counseling assistance.
2. **Update.** If a contact change his/her address, the only place where the address change will have to take place will be in the relation to Figure 4.2 and **not** in Table 4.3(A).

Table 4.3: Normalized Relation: Second Normal Form

(A) CONTACT Table

Contact No.	Date of Contact	Contact Name	Contact Address
1111	5/3/87	Smith	M. Street
1111	5/3/87	Smith	M. Street
1111	8/6/87	Smith	M. Street
1222	5/3/87	Jones	T. Street

(B) CLIENT Table

Case No.	Date Assigned	Consultant No.	Consultant Name
3753	3/8/87	E003	Mehdi
6811	5/9/87	E002	Edie
4550	5/9/87	E003	Mehdi

3. **Deletion.** If a client has to be deleted, the corresponding contact information could remain in the relation as shown in the Figure 4.2(B).

IV. Third Normal Form Relation

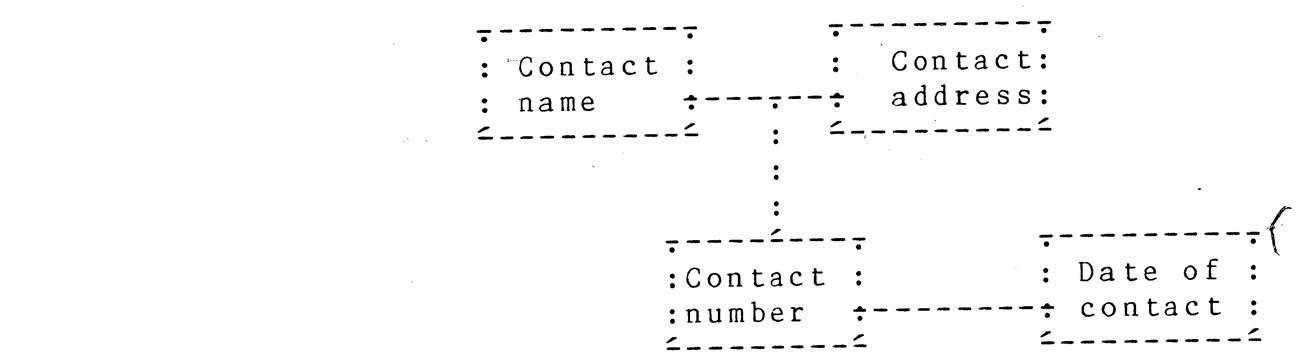
Despite the improvement, there still exist some anomalies in the system because of dependency of consultant name and consultant number.

1. **Insertion Anomaly.** We can not enter information about a consultant unless that consultant has already served a client.

2. **Update Anomaly.** Consultant information can not be independently updated

The solution to these problems is to replace two relations with three relations, as in Figure 4.3.

Figure 4.3 : Three Third Normal Form Relations



The relations CONTACT, CLIENT, and CONSULTANT are in the third normal form. In the third normal form there are no transitive functional dependencies between the nonkey attributes. As a result of creating three relations, the update anomalies are removed.

CHAPTER 5

SYSTEM DESIGN

The data flow diagram developed in Chapter 2 defined the boundary for the system design process and Chapter 4 provided the conceptual framework for designing the data base. The present chapter examines the system design. It is commonly known that a logical design proceeds from the top down.[1] General features, such as reports((**output**) and **inputs** are identified first. Then, the system design proceeds with the analysis of **data files**.

I. Output Design

Inputs from the SBDC staff and previous experience with DEC 20 reports were the two main sources of information in shaping the logical output design. Three types of reports are generally needed by the SBDC staff.

1. **Consultant Reports.** These reports are used by the SBDC consultants to keep track of their clients. In addition to mailing labels (11 by 14 inches), a general listing of all clients for a given consultant is required. Consultants would like to have a choice in selecting between a summary

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[1] James A. Senn, Analysis and Design of Information Systems, MCGraw Hill Book Company, 1984, Page 226.

listing (with 4 fields) and detailed listing (with 14 fields) for their clients.

2. **Manager Reports.** Several outputs are required to monitor the activities of the consultants between two specific dates. Also, a summary report of the overall activities of the Center should be available.

3. **Secretarial Reports.** This type of report includes sending form letters to the individuals who have contacted the Center, preparing mailing labels for all or a group of consultants' clients, and printing index cards for filing.

A sample of each of the three reports is given in Appendix C.

II. Input Design

The output design and review of additional documents provided the groundwork for designing both input and inquiry screens. a detailed design of the screen is included in Appendix D. The main menu provides three choices: Add, Search, and Print.

1. **Add New Contacts.** After entering a record, the operator has a choice of editing the input, going to the next record, deleting the record just entered, or entering to the main menu.

2. **Search the Database.** A search of the database can be conducted on any of the following fields: Name, Date of Initial Contact, Contact Number, Zip Code, Date Case Assigned, Consultant Number, Firm Name, Case Number.

3. **Print Menu.** The print menu consists of choices of printing mailing labels, listing clients for a given consultant, summarizing consultant activities, and printing letters for new contacts. For further details about the print menu see the previous section on **Output Design.**

III. Systems Files

The system consists of three database files and seven index files.

A. Database files:

1. CONS.DBF containing secondary information about a contact.
2. CASEINFO.DBF contains primary data on a client.

3. CONS.DBF contains consultants' names and numbers.

In Chapter 4, the underlying rational for selecting these three relations was discussed in detail. The structure of these data bases is examined in the following Chapter.

B. Index Files

1. NAMES.NDX
2. DATE-ASS.NDX
3. CONTACT-NO.NDX
4. ZIP.NDX
5. CONSULT.NDX
6. FIRM.NDX
7. CASE_NO.NDX

The .DBF files are the most important which contain entire data base. The .NDXs are index files used to search the data base in non-key fields, and are updated whenever a new case is entered to the system or changes are made to the existing records.

CHAPTER 6

DEVELOPMENT OF SOFTWARE

I. DATA DEFINITIONS

Given below are the names and definitions of data structure used in the new system.

1. Structure for Database: Cons.dbf representing CONTACT relation

Field	Field Name	Type	Width	Description
1	TITLE	Character	4	Title of Contact
2	LASTNAME	Character	15	Last Name
3	FIRSTNAME	Character	15	First Name
4	MIDDLE_INI	Character	1	Middle Initial
5	STREET	Character	30	Street Address
6	CITY	Character	20	City
7	ST	Character	2	State
8	ZIP	Character	10	Zip Code
9	**CONTACT**	**Numeric**	**6**	**Contact Number**
10	INIT_CONT	Date	8	Date of initial contact
11	AREA_CODE	Character	3	Phone's area code
12	EXCHANGE	Character	3	The First 3 digits in phone#
13	NUMBER	Character	4	The Remainder of digits
14	EXTENTION	Character	4	Phones Extension
15	REM1	Character	78	Remarks about a case
16	MAIL	Logical	1	When a letter sent to contact mail become equal to 1
TOTAL**			**205**	

2. Structure for Database: Caseinfo.dbf representing CLIENT relation

Field	Field Name	Type	Width	Description
1	**CONTACT**	**Numeric**	**6**	**Contact Number**
2	POSITION	Character	40	Contact Position in firm
3	FIRM	Character	40	Name of Firm
4	**CASE_NO**	**Numeric**	**5**	**Case Number**
5	**CONSLT_NO**	**Character**	**30**	**Consultant Number**
6	CONSULTANT	Character	30	Consultant Name
7	DATE_ASSIG	Date	8	Date Case Assigned
8	CLIENT	Logical	1	When a case is assigned it becomes a Client
TOTAL **			**135**	

3. Structure for Database: Cons.dbf representing Consultant relation

Field	Field Name	Type	Width	Description
1	CONS_NAME	Character	30	Consultant Name
2	**CONS_NO**	**Character**	**4**	**Consultant Number**
TOTAL **			**34**	

The primary keys (which have been highlighted) are contact number, case number and consultant number.

II. Application Programs

Several application programs have been written to RETRIEVE data or UPDATE the data base. These programs may be categorized as ADD, SEARCH, and PRINT.

1. Add Program

This program adds new contacts to the database and modifies the existing information. When a

contact is added, the program puts that contact on a queue. Then at the end of the working day, a letter is printed for each new contact using a print program. This letter along with a "Request for Counseling" form (See Appendix A) is mailed to the prospective client. A contact number is printed on the "Request for Counseling" form.

2. Search Program

The search program is mainly designed for query and retrieval of information, but also also to be used to generate small reports that are displayed on the terminal, or printed. The search may be done on any of the following fields: Name, date, initial contact, contact number, zip code, date case assigned, consultant number, firm name and case number.

When a contact mails the "Request for Counseling" form back to the Center, all the information associated to that contact is retrieved, using the contact number. At this point the contact officially becomes a "client", and a consultant is assigned to that client.

3. Print Program

The program consists of the following sub-routines:

A. **Mailing Labels** - This program is capable of producing labels for clients (in alphabetical or zip code order (from a given zip code to a given zip code. It can also produce labels for clients of a given consultant or from a given case number to a given case number.

B. **Client Listing** - The program prepares reports on clients and a given field such as date, zip code or a consultant number.

C. **Letter to New Clients** - As described in Add Program, a letter is sent to each new client and a logical field called "Mail" is then activated. After the letter is sent to them, Mail becomes equal to 1 otherwise it is equal zero. See Appendix B for a copy of this letter.

Copies of all of these programs are given in Appendix E.

CHAPTER 7

TESTING, IMPLEMENTATION AND SECURITY

After analyzing and studying all intermediate stages, the design and programming of the data base for the Lehigh University SBDC was completed. The system was ready for implementation using Dbase III+.

I. Testing

Using test data, the program has been tested under many different conditions including input of erroneous data. However, complete debugging of the program was not accomplished until three months after the new system was implemented.

II. Implementation

The new MIS system for the Lehigh University SBDC is a unique system which has been complimented by users, the operator (who has never worked with computers before) and other SBDCs. In addition to its modest cost, it is flexible enough to be expanded into other areas of activities.

III. Security

The secretary was trained to make copies of the data base files at the end of each working day. Ten floppy

disks, each two representing one day in the week, provided a simple and reasonable security to safeguard the integrity of the data.

For example, on Tuesday, the two floppy disks labeled "Tuesday *.NDX" and "Tuesday *.DBF" are used. The first disk contains the copies of all the index files and the second disk contains copies of the database files, in their entirety. A back-up copy of all the programs is also kept at a different location.

Finally, to facilitate the rebuilding of the database in case of crash, accidental loss of data, or other unforeseen reasons a simple program was developed to rebuild all the index files.

IV. Conclusion and Suggestions for Further Development

This thesis demonstrated the step-by-step process of initiating and developing a management information system for Lehigh University SBDC. It emphasized the importance of involving prospective users in constructing a data base, as well as having a methodology to aid in developing the conceptual framework for the data base model.

This thesis documented a new MIS system using the following development process: (1) Preliminary Investigation, (2) Determination of System Requirements, (3) Cost and Benefit Analysis of the Proposed System, (4) Relational Concept for the Design Process, (5) Design of System, (6) Development of Software, and (7) Systems Testing, Implementation and Security.

Further improvements in the system can be obtained in two different directions: (i) using the new telephone systems at Lehigh University, the capability of a network micro-computer-based MIS could be further studied; and (ii) Phasing out the DEC 20 and KnowledgeMan systems by consolidating all SBDC data bases.

APPENDIX A:

REQUEST FOR SERVICE

Lehigh University

Small Business Development Center
telephone (215) 758-3980

412 S. New St. 203
Bethlehem, Pennsylvania 18015

CASE #_____

REQUEST FOR SERVICE

I request service from the Small Business Development Center. I understand that the counselor assigned will treat all information and data received in complete confidence and that the counselor will not concurrently serve me and competing clients without full disclosure to all parties concerned. In turn, I agree to provide the counselor, upon request, with current financial and operating data and to satisfy such other reasonable requests as may be made by the SBDC during its period of service in my behalf.

I understand this to be a management and technical assistance service provided by the Small Business Development Center for which no fees will be solicited or accepted for services provided by SBDC personnel. In consideration of the requested service, I hereby waive my right to any and all claims arising from this service against the consultant, the Lehigh University Small Business Development Center, Lehigh University, the Trustees of Lehigh University, the Trustees of the University of Pennsylvania and the Small Business Administration.

SIGNATURE_____DATE_____

(please type or print)

INDIVIDUAL REQUESTING SERVICE_____

COMPANY NAME (If appropriate)_____

TITLE_____

ADDRESS_____

CITY_____STATE_____ZIP_____

COUNTY_____PHONE NUMBER (Day)_____

THE NATURE AND PRODUCT OF YOUR BUSINESS

Do you offer a product and/or service? (circle one) Describe_____

_____

Other (Specify)_____

Do you sell wholesale or retail? (circle one)

Year Founded_____Number of Employees_____Annual Sales_____

Circle one: Sole Proprietorship Partnership Corporation

Are you currently receiving SBDC promotional materials? ___Yes ___No

How did you hear about the SBDC?_____

_____

Have you ever contacted or worked with an SBDC in the past?

_____Yes _____No

What specific problem or project do you want to work on with an SBDC consultant? Feel free to attach additional pages if necessary. This information is used to match the appropriate consultant to your business.

_____

_____

_____

CHECK THE PROBLEM AREAS FOR WHICH YOU SEEK COUNSELING

_____1. Business Start-Up/Acquisition
_____2. Sources of Capital
_____3. Marketing/Sales
_____4. Government Procurement
_____5. Accounting, Records and Taxes
_____6. Finan.Analysis/Cost Control
_____7. Inventory Control
_____8. Engineering, R & D
_____9. Personnel
_____10. Computer Systems
_____11. International Trade
_____12. Business Liquidation/ Sale

Other_____

_____

Can you furnish a recent balance sheet? _____Yes _____No
Can you furnish a recent profit and loss statement? _____Yes _____No
Have you ever applied for an SBA loan? _____Yes _____No
Do you now have a business loan? _____Yes _____No

The following information could be useful for government programs. If appropriate please complete.

Vietnam-Era Veteran? _____Yes ___No
Veteran? _____Yes ___No
Member of racial minority _____Yes ___No
Handicapped? _____Yes ___No

APPENDIX B:

COVER LETTER SENT TO NEW CLIENTS

Lehigh University

Small Business Development Center
telephone (215) 758-3980

412 S. New St. 203
Bethlehem, Pennsylvania 18015

02/10/87

Mack Robinson
739 Lance Place
Reading, PA 19604

Dear Mr. Robinson:

In response to your inquiry, we are sending you information about SCORE, the Small Business Development Center and our services.

If you are interested in free counseling, complete and sign the enclosed Request for Counseling, Form 641. Please answer all the questions to the best of your knowledge and return it to me in the enclosed envelope. After we receive the completed form a counselor will contact you to arrange an appointment.

In addition, the Small Business Development Center maintains a library of resources helpful to anyone interested in starting or improving a small business. It includes many start-up manuals for specific businesses as well as general information on small business problems. The library is open to the public Monday through Friday, 8:15 a.m. to 4:45 p.m.

Sincerely yours,

Edith D. Ritter
Program Administrator

EDR/pa

Enclosures

APPENDIX C:

OUTPUT DESIGN

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxx Xxxxxxxxxxxxxx XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX XX XXXXX-XXXX

(XXX) XXX-XXXX

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxx Xxxxxxxxxxxxxx XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX XX XXXXX-XXXX

(XXX) XXX-XXXX

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxx Xxxxxxxxxxxxxx XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX XX XXXXX-XXXX

(XXX) XXX-XXXX

R&M Flooring
Marie Pretopapa
2434 Hay Street
Easton PA 18042

70800

Debra Maleski
7 Iroquois Street
Schnecksville PA 18078

70801

April Hymans
688 W. Montgomery St. Apt. 7
Allentown PA 18103

70804

Jo Freeman
741 Cedar Street
Allentown PA 18102

70805

Campus Peddler
Ellen Woolley
RD # 1 Box 140
Zionsville PA 18092

70806

Joanne Kostenbader
128-D Alpine Drive RD # 1
Hellertown PA 18055

70807

John Guglinzzi
429 Russell Avenue
Phillipsburg NJ 08865

70808

Marlene Koehler
1522 Chew Street
Allentown PA 18102

70809

Cook's Fruit Market
Gregory McCarthy
2201 A Willow Lane

70810

Briwall
Janet Brito
RD # 1 Box 323

70811

PaPa's Restaurant
Adel Abdalla
1 Parkview Drive

70812

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxx Xxxxxxxxxxxxxx XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX XX XXXXX-XXXX

(XXX) XXX-XXXX

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxx Xxxxxxxxxxxxxx XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX XX XXXXX-XXXX

(XXX) XXX-XXXX

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxx Xxxxxxxxxxxxxx XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX XX XXXXX-XXXX

(XXX) XXX-XXXX

Cook's Fruit Market
Gregory McCarthy
2201 A Willow Lane
Macungie PA 18062

(215) 395-6534

70810

Briwall
Janet Brito
RD # 1 Box 323
Mertztown PA 19539

(215) 683-5433

70811

PaPa's Restaurant
Adel Abdalla
1 Parkview Drive
Schnecksville PA 18078

(215) 799-0726

70812

Martha Lawson
97 W. Broadway
Jim Thorpe PA 18229

(717) 325-3923

70813

Central Lanes
Cynthia Aykroyd
1980 Ravenwood Drive
Bethlehem PA 18018

(215) 865-5721

70814

Chimney Sweep Services
Linda Petras
2402 Elm Street
Allentown PA 18104

(215) 435-4355

70815

Kathy Zettlemoyer
16 West Vine Street
Fleetwood PA 19522

(215) 944-0168

70816

Magic-Grams
John Tomecsek, Jr.
224 North Jefferson St.
Allentown PA 18102

(215) 434-4111

70817

John Bishop
2130 Old Bethlehem Pike
Quakertown PA 18951

(215) 536-9158

70818

Ron Merkel Glass Inc.
Ronald Merkel
RD # 1 Box 1480
Leesport PA 19533

(215) 926-6508

70819

Calico Peddler'
Michelle Lenhart
318 W. Race St.
Fleetwood PA 19522

(215) 944-8025

70820

y Pinter
805 Prospect Avenue
Bethlehem PA 18018
(215) 253 - 7787 EXT:
FIRM: Pinter Trading co.
POSITION:
REMARKS:

INIT CONT: 03/31/87 CONTACT: 702
DATE ASSN: 03/31/87 CASE NO: 70454
CONSULTANT: Mehdi Hojjat
CONSULT NO: E003

Paul Binder
2910 Schoeneck Road
Macungie PA 18062
(215) 966 - 3555 EXT:
FIRM: WENZCO SUPPLIES
POSITION: Owner
REMARKS:

INIT CONT: 04/01/87 CONTACT: 712
DATE ASSN: 04/01/87 CASE NO: 70463
CONSULTANT: Mehdi Hojjat
CONSULT NO: E003

Peter Illari
RTS. 191 & 33
Stockertown PA 18083
(215) 759 - 5811 EXT:
FIRM: LCI Medical
POSITION: Sales Coordinator
REMARKS:

INIT CONT: 04/14/87 CONTACT: 770
DATE ASSN: 04/14/87 CASE NO: 70491
CONSULTANT: Mehdi Hojjat
CONSULT NO: E003

Rolf Schlake
South Mountain Drive
Bethlehem PA 18015
(215) 861 - 7400 EXT:
FIRM: Applied Separations
POSITION: President
REMARKS:

INIT CONT: 04/14/87 CONTACT: 771
DATE ASSN: 04/14/87 CASE NO: 70492
CONSULTANT: Mehdi Hojjat
CONSULT NO: E003

Wallace E Frank
301 Broadway
Bethlehem PA 18015
(215) 691 - 7055 EXT:
FIRM: Response Systems Company
POSITION: President
REMARKS:

INIT CONT: 04/15/87 CONTACT: 779
DATE ASSN: 04/15/87 CASE NO: 70499
CONSULTANT: Mehdi Hojjat
CONSULT NO: E003

Paul D Donahue
P.O. Box 2551
Lehigh Valley PA 18001
(215) 395 - 3771 EXT:
FIRM: Coulbourn International, Inc.
POSITION: President
REMARKS:

INIT CONT: 05/04/87 CONTACT: 845
DATE ASSN: 05/04/87 CASE NO: 70541
CONSULTANT: Mehdi Hojjat
CONSULT NO: E003

Summary from 05/01/87 to 06/01/87 for Mehdi Hojjat E003

Case	Contact	Firm	Date Assigned
70541	Donahue	Coulbourn International, Inc.	05/04/87
70594	Saleet	The Bananna Tree	05/15/87
70598	Navarro		05/18/87
70620	Delucia		05/22/87
70621	Anderson	Margaret Grace Bridal Millinery	05/22/87
70628	Sidler	TLC Travel Service	05/22/87
70652	Mastascusa	Chinese Trading Company	05/27/87

Cases Assigned from 06/01/87 to 06/05/87

No	Name	Total
E---	All E Consultants	0
E002	Edie Ritter	0
E003	Mehdi Hojjat	0
E013	John Tate	4
E018	Jay Talbott	0
E020	Mary Harhigh	0
E021	Tom Weiss	0
E022	Melanie Kemmerle	0
E023	George Miller	0
E024	Ken Hochstetler	0
E025	Mary Lou Kline	0
E026	John Nothelfer	0
E027	Carolyn Pasciak	0
E028	Dan Wiekrykas	0
E030	Eve Dintino	0
E031	Kathy Wallace	0
E032	Tom Ritter	1
E033	Larry Strain	4
E034	Linda Sweetman	0
E035	John Guerra	3
E036	Dawn L. Steimel	0
E037	Pat McCarthy	1
E038	Kathy Frazier	0
E027	Carolyn Pasciak	0
E033	Larry Strain	0
E002	Edie Ritter	0
G---	All G Consultants	0
S---	All S Consultants	2
Total		15

APPENDIX D:

INOUT DESIGN

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER

Choose by number or type q to quit

1> Add new contacts
2> Search the database
3> Print

Enter choice: 1

Firstname: MI: Lastname: Date: 02/02/87
Title: Contact No: 340
Street:
City: State: Zip:

Phone: ( ) - EXT:
Position:
Firm:

Remarks:

Everything ok ? (Y or N)

Assign case now ? (Y or N)

Append more ? (Y or N)

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER

Choose by number or type q to quit

1> Add new contacts
2> Search the database
3> Print

Enter choice: 2

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER

Choose by number or type q to quit

Search by:

1> Name
2> Date of Initial Contact
3> Contact Number
4> Zip Code
5> Date Assigned
6> Consultant Number
7> Firm Name
8> Case Number

Enter choice:

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER

Choose by number or type q to quit

1> Add new contacts
2> Search the database
3> Print

Enter choice: 3

Make sure the printer is turned on.
Press any key to continue...

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER

Choose by number or type q to quit

Print:

1> Mailing Labels
2> Client Listings
3> Summaries
4> Letters to New Contacts

Enter choice: 3

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER SUMMARIES

Choose by number or type q to quit

1> Verbose Summary by Consultant.
2> General Summary all Consultants by Date

Enter choice:

Make sure the printer is turned on.
Press any key to continue...

LEHIGH UNIVERSITY
SMALL BUSINESS DEVELOPMENT CENTER

Choose by number or type q to quit

Print:

1> Mailing Labels
2> Client Listings
3> Summaries
4> Letters to New Contacts

Enter choice:

APPENDIX E:

APPLICATION PROGRAMS

```
procprocedure start
do while .t.
   store ' ' to choose
   do while .not.(choose$'123459')
   clear
      ?
      ?'                              Small Business Development Center'
      ?'                                      Survey'
      ?'                                   Main Menu'
      ?
      ?'                                Choose by number'
      ?
      ?'                             1> Add new records'
      ?'                             2> Search database by index
      ?'                             3> Edit by case number'
      ?'                             4> Make labels'
      ?'                             5> Make report'
      ?
      ?'                             9> Quit'
      ?
      wait '                              Enter choice   ' to choose'
enddo
clear
do case
   case choose = '1'
      set index to case,sales,sic,employ,city,county,zip
      do addsome
   case choose = '2'
      do writeup with 'S'
   case choose = '3'
      do findc
      store ' ' to choose
case choose = '4'
   do labit
   set print off
   set console on
case choose = '5'
   clear
   set confirm off
   set intensity off
   store ' ' to where
   do while .not.(where$'PD')
      store ' ' to where
      @11,20 say 'Enter P for Printer or D for Disk ' get
```

```
                                                    where picture '@!'
         read
      enddo
      clear
      set confirm on
      set intensity on
      do writeup with where
      ?
      close alte
      set console on
      set print off
      set alte off
   case choose = '9'
      set bell on
      set talk on
            clear all
            return
   endcase
enddo
*
*
*
*
*
*
*
*
*
procedure addsome
store 0 to endyet
store ' ' to choose
do while .not.(choose$'Q')
   do case
      case choose='A'
         append blank
         do change
      case choose='B'
         set index
         go recno()-1
         endyet=endyet+1
         do while dele()=.t.
            go recno()-1
            endyet=endyet+1
      enddo
      store recno() to hold
      set index to sales,city,zip,case,county,employ.sic
      go hold
case choose='E'
   recall
   do change
case choose='F'
   set index
   go recno()+1
```

```
            endyet=endyet-1
            store dele() to please
            store please.and.(endyet>.01) to please
            do while please
               go recno()+1
               endyet=endyet-1
               store dele() to please
               store please.and.(endyet>.01) to please
            enddo
            store recno() to hold
            set index to sales,city,zip,case,county,employ,sic
            go hold
endcase
clear
if (sic+case=0).and.len(trim(zipc+firm+street+city+state))=0 then
   dele
   else
      if title='      '
         ?space(5)+contact,space(37-col())+'Case: ',case,space(50-c-
ol())+'                                                    Phone:
',phone
      else
         ?space(5)+trim(title),contact,space(37-col())+'Case: ',cas-
e,space(50-col())+'Phone:      ',phone
      endif
      ?space(5)+firm,space(50-col())+'SIC:          ',sic
      ?space(5)+street,space(50-col())+'Sales:      ',sales
      ?space(5)+trim(city)+', ',state,zipc,space(37-col())+'Coun-
ty: ',county,space(50-col())+'Employees: ',employees
      ?
   endif
   set confirm off
   set intensity off
   store ' ' to choose
   if endyet<.01
      do while .not.(choose$'ABEQ')
         store ' ' to choose
         @11,15 say 'Enter A to Append more'
         @12,15 say 'Enter B to Backup to the previous record'
         @13,15 say 'Enter E to Edit the current record'
         @15,15 say 'Enter Q to Quit '
         @17,20 get choose picture '@!'
         read
      enddo
else
   do while .not.(choose$'ABEFQ')
      store ' ' to choose
      @11,15 say 'Enter A to Append more'
      @12,15 say 'Enter B to Backup to the previous record'
      @13,15 say 'Enter E to Editing the current record'
      @14,15 say 'Enter F to go Forward a record'
      @16,15 say 'Enter Q to Quit '
```

```
            @18,20 get choose picture '@!'
            read
         enddo
   endif
   clear
   set confirm on
   set intensity on
   clear
enddo
store ' ' to choose
return
*
*
*
*
procedure change
clear
@7,16 say '    CASE ' get case picture '@z'
@9,3 say 'TITLE ' get  title
@9,16 say 'CONTACT ' get contact
@9,50 say 'PHONE ' get phone
@10,16 say '    FIRM ' get firm
@11,16 say ' STREET ' get street
@12,16 say '    CITY ' get city
@12,45 say 'STATE ' get state picture '@!'
@12,55 say 'ZIP ' get zipc picture '99999'
@12,66 say 'COUNTY ' get county picture '@!'
@14,16 say '     SIC ' get sic picture '@z'
@15,16 say '   SALES ' get sales picture '@z'
@16,14 say 'EMPLOYEES ' get employees picture '@z'
set intensity off
store ' ' to j1
store ' ' to j2
store ' ' to j3
store ' ' to j4
@21,2 get j1
@21,2 get j2
@21,2 get j3
@21,2 get j4
store ' ' to j1a
store ' ' to j2b
store ' ' to j3c
store ' ' to j4d
@1,2 get j1a
@1,2 get j2b
@1,2 get j3c
@1,2 get j4d
set intensity on
read
clear
return
```

```
*
*
*
*
*
*
*
procedure writeup
parameters where
clear
do while .t.
    store ' ' to choose
    do while .not.(choose$'1234569')
       store ' ' to choose
       clear
    do case
    case where $'Ss
       ?
       ?'                          Small Business Development Center'
       ?'                                Survey'
       ?
       ?'                              Search Menu'
       ?
       ?'                           Choose by number'
       ?
       ?'                         1> Search by SIC'
       ?'                         2> Search by employees
       ?'                         3> Search by sales'
       ?'                         4> Search by city'
       ?'                         5> Search by county'
       ?'                         6> Search by case number'
       ?
       ?'                         9> Quit Search'
       ?
    case where$'DdPp'
       ?
       ?'                          Small Business Development Center'
       ?'                                Survey'
       ?
       ?'                              Report Menu'
       ?
       ?'                           Choose by number'
       ?
       ?'                         1> Report by SIC'
       ?'                         2> Report by employees'
       ?'                         3> Report by sales'
       ?'                         4> Report by city'
       ?'                         5> Report by county'
       ?'                         6> Report by case number'
       ?
       ?'                         9> Quit Report'
       ?
```

```
      endcase
      wait '                                  Enter choice   ' to choose
   enddo
   clear
   set confirm off
   set intensity off
   if choose='9' then
      store 'A' to medium
   else
      store ' ' to medium
   endif
   do while .not.(medium$'AR')
      store ' ' to medium
      @11,20 say 'Enter A for All or R for Range ' get medium picture
'@!'
      read
   enddo
   clear
   set confirm on
   set intensity on
   do case
      case choose = '1'
         set index to sic
         go top
         if medium = 'R' then
            store '    ' to s1c
            store '    ' to s2c
            @3,20 say 'Search or Report by SIC'
            @5,20 say 'Enter beginning SIC ' get s1c picture '9999'
            @6,20 say '   Enter ending SIC ' get s2c picture '9999'
            read
            store val(s1c) to s1
            store val(s2c) to s2
            clear
            if (s1<0).or.(s1>s2) then
               loop
            endif
            store s1 to first
            store s2 to last
            store 'sic' to which
            store 'SIC' to crud
            seek first
            if eof()
               append blank
               replace sic with s1
               delete
               skip
            endif
      else
         store 9999 to last
         store 'sic' to which
         store 'SIC' to crud
```

```
      endif
   case choose = '2'
      set index to employ
      go top
      if medium = 'R' then
         store '     ' to e1c
         store '     ' to e2c
         @3,20 say 'Search or Report by number of employees'
         @5,20 say 'Enter beginning number ' get e1c picture
'99999'
         @6,20 say '   Enter ending number ' get e2c picture
'99999'
         read
         store val(e1c) to e1
         store val(e2c) to e2
         clear
         if (e1=0).or.(e1>e2) then
            loop
         endif
         store e1 to first
         store e2 to last
         store 'employees' to which
         store 'Employees' to crud
         seek first
         if eof()
            append blank
            replace employees with e1
            delete
            skip
         endif
      else
         store 99999 to last
         store 'employees' to which
         store 'Employees' to crud
      endif
   case choose = '3'
      set index to sales
      go top
      if medium = 'R' then
         store space(11) to sa1c
         store space(11) to sa2c
         @3,20 say 'Search or Report by sales'
         @5,20 say 'Enter beginning sales ' get sa1c picture
'99999999999'
         @6,20 say '   Enter ending sales ' get sa2c picture
'99999999999'
         read
         store val(sa1c) to sa1
         store val(sa2c) to sa2
         clear
         if (sa1=0).or.(sa1>sa2) then
            loop
```

```
      endif
      store 'sales' to which
      store 'Sales' to crud
      store sa2 to last
      store sa1 to first
      seek first
      if eof()
         append blank
         replace sales with sa1
         delete
         skip
      endif
   else
      go top
      store 99999999999 to last
      store 'sales' to which
      store 'Sales' to crud
   endif
case choose  = '4'
   set index to city
   go top
   if medium = 'R' then
      store space(18) to c1
      @3,20 say 'Search or Report for a city'
      @5,20 say 'Enter city ' get c1 picture '@!'
      read
      clear
      if c1=space(18) then
         loop
      endif
      store 'upper(city)' to which
      store 'City' to crud
      seek c1
      store c1+'99999' to last
   else
      store 'ZZZZZZZZZZZZZZZZZZZZZ' to last
      store 'upper(city)' to which
      store 'City' to crud
   endif
case choose  = '5'
set index to county
go top
if medium = 'R' then
   store space(1) to c1
   @3,20 say 'Search or Report for a county'
   @5,20 say 'Enter county ' get c1 picture '@!'
   read
   clear
   if c1=space(1) then
      loop
   endif
   store 'county' to which
```

```
            store 'County' to crud
            seek c1
            store c1+'99999' to last
         else
            store 'Z99999' to last
            store 'county' to which
            store 'County' to crud
         endif
      case choose = '6'
         set index to case
         go top
         if medium = 'R' then
            store '      ' to c1c
            store '      ' to c2c
            @3,20 say 'Search or Report by case number'
            @5,20 say 'Enter beginning number ' get c1c picture
'99999'
            @6,20 say '   Enter ending number ' get c2c picture
'99999'
            read
            store 'val(c1c)' to c1
            store 'val(c2c)' to c2
            clear
            if (c1=0).or.(c1>c2) then
               loop
            endif
            store c1 to first
            store c2 to last
            store 'case' to which
            store 'Case' to crud
            seek first
            if eof()
               append blank
               replace case with c1
               delete
               skip
            endif
         else
            store 99999 to last
            store 'case' to which
            store 'Case' to crud
         endif
      case choose = '9'
         return
   endcase
   store &which<=last to ifso
   if (eof()).or.(.not.ifso)
      @11,20 say 'No match.  Strike any key to continue'
      wait ' '
      loop
   endif
   do case
```

```
        case where$'Pp' then
            ?'
            ?'
            ?'
            ?'
            ?'
            ?'
            ?'
            ?'          Turn on the printer; set top of forms and all
that'
            ?'                  and strike any key when ready.'
            wait '
            clear
            set print on
            set console off
            store 9 to maxcount
        case where $'Dd'
            erase report.dsk
            set alternate to 'report.dsk'
            set alternate on
            store 9 to maxcount
        case where $'Ss'
            store 5 to maxcount
    endcase
    endif
    do while ifso
        if where$'PpDd' then
            ?
            ?
            ?
            ?'                          Small Business Development Center'
            ?'                                  Survey'
            ?
        endif
        store 1 to count
        do while ifso
            do case
                case where$'Pp'
                    ?space(4),crud+' ',&crud
                    if title='
?space(5)+contact,space(37-pcol())+'Case: ',case,space(50-pcol())
+'Phone:      ',phone
                    else

?space(5)+trim(title),contact,space(37-pcol())+'Case: ',case,spac-
e(50-pcol())+'Phone:      ',phone
                    endif
                    ?space(5)+firm,space(50-pcol())+'SIC:        ',sic
                    ?space(5)+street,space(50-pcol())+'Sales:      ',sales

?space(5)+trim(city)+',',state,zipc,space(37-pcol())+'County: ',c-
```

```
ounty,space(50-pcol())+'Employees: ',employees
                ?
             case where$'DdSs'
                ?space(4),crud+': ',&crud
                if title='      '

?space(5)+contact,space(37-col())+'Case: ',case,space(50-col())+'-
Phone:      ',phone
                else

?space(5)+trim(title),contact,space(37-col())+'Case: ',case,space-
(50-col())+'Phone:      '.phone
                endif
                ?space(5)+firm,space(50-pcl())+'SIC:        ',sic
                ?space(5)+street,space(50-col())+'Sales:      '.salos

?space(5)+trim(city)+', ',state,zipc,space(37-col())+'County: ',co-
unty,space(50-col())+'Employees: ',employees
                ?
          endcase
          skip
          store count+1 to count
          store  .not.eof().and.(&which<>last).and.(count<maxcount)
to ifso
     enddo
     do case
        case where$'Pp' then
           eject
        case where$'Dd'
           ?chr(12)
        case where$'Ss'
           store ' ' to leave
           wait 'Enter Q to quit,'anything else to'continue ' to
leave
           clear
           if leave$'Qq' then
              go bott
              skip
              clear
           endif
     endcase
        store (.not.eof()).and.(&which<=last) to ifso
   enddo
set print off
set console on
enddo
return
*
*
*
*
*
```

```
*
*
procedure findc
set index to case,employ,city,county,sales,sic,zip
store .t. to itso
do while itso
   store space(5) to who
   @10,30 say "Enter case number"
   @12,35 get who picture '@9'
   read
   clear
   if who<>space(5) then
      seek val(who)
   else
      return
   endif
   if eof() then
      set confirm off
      set intensity off
      store ' ' to none
      do while .not.(none$'CQ')
         store ' ' to none
         @11,20 say 'No match.  Enter C to Continue or Q to quit '
get none picture '@!'
         read
      enddo
      set intensity on
      set confirm on
      clear
      if none='Q'
         store .f. to itso
      endif
   else
      store .t. to more
      do while more
         if title='

?space(5)+contact,space(37-col())+'Case: ',case,space(50-col())+'
Phone:      ',phone
         else
?space(5)+trim(title),contact,space(37-col())+'Case: ',case,space
(50-col())+'Phone:      ',phone
         endif
         ?space(5)+firm,space(50-col())+'SIC:        ',sic
         ?space(5)+street,space(50-col())+'Sales:      ',sales
         ?space(5)+trim(city)+', ',state,zipc,space(37-col())+'Coun-
ty: ',county,space(50-col())+'Employees: ',employees
         ?
         set confirm off
         set intensity off
         store row()+3 to here
```

```
store ' ' to dowhat
do while .not.(dowhat$'EDCBFQ')
   store ' ' to dowhat
   @here,20  say   'Enter B to Backup to previous record,'
   @here+1,20 say  'Enter C to Continue searching'
   @here+2,20 say  'Enter D to Delete this record'
   @here+3,20 say  'Enter E to Edit this record'
   @here+4,20 say  'Enter F to go Forward a record'
   @here+6,20 say  'Enter Q to Quit '
   @here+8,25 get dowhat picture '@!'
   read
enddo
clear
set confirm on
set intensity on
do case
   case dowhat='B'
      if .not.bof() then
         skip -1
      endif
   case dowhat='F'
      if .not.eof() then
         skip 1
      endif
   case dowhat='E'
      do change
   case dowhat='C'
      store .f. to more
   case dowhat='Q'
      store .f. to itso
      store .f. to more
   case dowhat='D'
      set confirm off
      set intensity off
      store ' ' to makesure
      do while .not.(makesure$'CS')
         store ' ' to makesure
         @11,15 say 'Enter C to confirm deletion, S to stop"
deletion' get makesure picture '@!'
         read
      enddo
      clear
      set confirm on
      set intensity on
      if makesure= 'C'
         delete
         store .f. to more
      endif
   endcase
enddo
endif
enddo
```

```
return
*
*
*
*
*
*
*
procedure xxxxx
store ' ' to more
do while .not.(more$'Qq')
   set print on
   set console off
   ?
   ??' Xxxxx Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx    XXXXX'
   ?'Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx'
   ??' Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx'
   ?'Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx'
   ??' Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx'
   ?'Xxxxxxxxxxxxxxxxxxxx, XX XXXXX
   ??' Xxxxxxxxxxxxxxxxxxx, XX XXXXX'
   ?
   set print off
   set console on
   wait 'Type Q to quit samples, anything else for more ' to more
enddo
return
*
*
*
*
procedure labit
do while .t.
   clear
   store ' ' to choose
   do while .not.(choose$'1234569')
      ?
      ?'                                Small Business Development Center'
      ?'                                        Survey'
      ?
      ?'                                    Labels Menu'
      ?
      ?'                                  Choose by number'
      ?
      ?'                                1> Label by SIC'
      ?'                                2> Label by employees'
      ?'                                3> Label by sales'
      ?'                                4> Label by city'
      ?'                                5> Label by county'
      ?'                                6> Label by case'
      ?
```

```
        ?'                                  9> Quit Label'
        ?
        wait '                                  Enter choice ' to choose
        clear
    enddo
    do case
        case choose = '1'
            set index to zip
            go top
            store '      ' to s1c
            store '      ' to s2c
            @3,20 say 'Label by SIC'
            @5,20 say 'Enter beginning SIC ' get s1c picture '9999'
            @6,20 say '   Enter ending SIC ' get s2c picture '9999'
            read
            store val(s1c) to s1
            store val(s2c) to s2
            clear
            if (s1=0).or.(s1>s2) then
               loop
            endif
            locate for (s1<=sic).and.(s2>=sic)
        case choose = '2'
            set index to zip
            go top
            store '      ' to e1c
            store '      ' to e2c
            @3,20 say 'Label by number of employees'
            @5,20 say 'Enter beginning number ' get e1c picture '99999'
            @6,20 say '   Enter ending number ' get e2c picture '99999'
            read
            store val(e1c) to e1
            store val(e2c) to e2
            clear
            if (e1=0).or.(e1>e2) then
               loop
            endif
            locate for (e1<=employees).and.(e2>=employees)
        case choose = '3'
            set index to zip
            go top
            store space(11) to sa1c
            store space(11) to sa2c
            @3,20 say 'Label by sales'
            @5,20 say 'Enter beginning sales ' get sa1c picture
'99999999999'
            @6,20 say '   Enter ending sales ' get sa2c picture
'99999999999'
            read
            store val(sa1c) to sa1
            store val(sa2c) to sa2
            clear
```

```
      if (sa1=0).or.(sa1>sa2) then
         loop
      endif
      locate for (sa1<=sales).and.(sa2>=sales)
   case choose  = '4'
      set index to city
      go top
      store space(18) to c1
      @3,20 say 'Label for a city'
      @5,20 say 'Enter city ' get c1 picture '@!'
      read
      clear
      if c1=space(18) then
         loop
      endif
      seek c1
   case choose  = '5'
      set index to county
      go top
      store space(1) to c1
      @3,20 say 'Label for a county'
      @5,20 say 'Enter county ' get c1 picture '@!'
      read
      clear
      if c1=space(1) then
         loop
      endif
      seek c1
   case choose = '6'
      set index to zip
      go top
      store '     ' to c1c
      store '     ' to c2c
      @3,20 say 'Label by case number'
      @5,20 say 'Enter beginning number ' get c1c picture '99999'
      @6,20 say '   Enter ending number ' get c2c picture '99999'
      read
      store val(c1c) to c1
      store val(c2c) to c2
      clear
      if (c1=0).or.(c1>c2) then
         loop
      endif
      locate for (c1<=case).and.(c2>=case)
   case choose = '9'
      return
endcase
if .not.eof()
   do xxxxx
   set print on
   set console off
   store .f. to now
```

```
store .t. to condit
do while condit
   if now
      ?
      ?p1,p2,p3
      do case
         case contact=' '
         ?? space(32),case
         case title=' '
            ?? contact+'          ',case
         otherwise
            ??title+contact+'    '.case
      endcase
      ?p4+firm
      ?p5+street
      ?p6+p7+trim(city)+', '+state+' '+zipc
      ?
      store .f. to now
else
   do case
      case contact=' '
         store space(32) to p1
      case title=' '
         store contact+space(8) to p1
      otherwise
         store title+contact+'    ' to p1
   endcase
   store substr(str(case),6,5) to p2
   store '   ' to p3
   store firm+'    ' to p4
   store street+'        ' to p5
   store trim(city)+',  +state+' '+zipc to p6
   store space(41-len(p6)) to p7
   store .t. to now
endif
do case
   case choose$'1236'
      continue
      store .not.eof() to condit
   case choose='4'
      skip
      store upper(city)=c1 to condit
   case choose = '5'
      skip
      store county=c1 to condit
   endcase
enddo
if now
   ?
   ?p1,p2
   ?p4
   ?p5
```

```
                ?p6
                ?
            endif
            set print off
            set console on
        endif
    enddo
```

APPENDIX F:

ZEC 2X DOCUMENTATION

SAMPLE EXECUTION OF THE APPLICATION PROGRAMS

A sample execution of each program is listed below:

1. SAMPLE EXECUTION OF PROGRAM PHAS1.CBL

```
@exeCUTE (FROM) phas1.cBL
COBOL:  PHAS1    [PHAS1.CBL]
LINK:   Loading
[LNKXCT PHAS1 execution]
!----------------------!
! DATA ENTERING PHASE 1!
! ENTER <O> FOR CASE # !
! TO QUIT THE PROGRAM  !
!----------------------!
ENTER NEXT CASE #  ==>> 5555
ENTER <V> TO VALIDATE CASE #  ==>> v
ENTER CONTACT NAME
------------------
ENTER CONTACT LAST NAME   ==>>  humuyan
ENTER CONTACT FIRST NAME  ==>>  arif
ENTER CASE NAME  ==>> bethlehem steel
ENTER CASE ADDRESS
---------------------
ENTER STREET  ADDRESS ==>> 234 3rd st.
ENTER CITY ADDRESS    ==>> b
ENTER STATE CODE      ==>>
ENTER ZIP CODE        ==>> 18015
ENTER <Y> TO STORE CASE  TEL ==>> y
ENTER  TELEPHONE
---------------
ENTER  AREA CODE ==>>
ENTER  NUMBER    ==>> 4561122
ENTER CONSULTANT # ==>> s140
ENTER <V> TO VALIDATE THE CONSULTANT # ==>>    v
ENTER NEXT CASE #  ==>> 0
EXIT
```

2. SAMPLE EXECUTION OF UPDAT.CBL

```
@exeCUTE (FROM) updat.cBL
COBOL:  UPDAT   [UPDAT.CBL]
LINK:   Loading
[LNKXCT UPDAT execution]
----------------------------------------
```

```
!SELECT ONE OF THE FOLLOWING UPDATE CODES!
!<A> For case DATES update                !
!<B> For HOURS and closing DATE updates   !
!<C> For deleting a CASE                   !
!<D> For SECOND PHASE of entering data     !
!<E> For other info updates on a CASE      !
!<F> For case SIC # and description        !
-------------------------------------------

ENTER UPDATE CODE  ==>> d
*****************************
! This data entering PHASE 2!
! To QUIT this procedure    !
! Enter <0> for CASE #      !
*****************************
ENTER  CASE #  ==>> 5555
ENTER <V> TO VALIDATE CASE #  ==>> v
ENTER OPENING DATE
------------------
ENTER MONTH ==>> 8
ENTER DAY  ==>> 13
ENTER <Y> IF CASE BEING CLOSED ==>>  y
ENTER CLOSING DATE
------------------
ENTER MONTH ==>> 8
ENTER DAY  ==>> 13
ENTER <Y> IF FEMALE   ==>>
ENTER <Y> IF  MINORITY  ==>> y
ENTER <Y> IF  VETERAN   ==>>
ENTER <Y> IF PRE-VENTURE  ==>>  y
ENTER SIC #  ==>> 3333
ENTER <V> TO VALIDATE SIC #   ==>>  v
ENTER SIC DESCRIPTION ==>> none
ENTER CASE SALES  ==>>
ENTER CASE NUMBER OF EMPLY ==>>
ENTER CURRENT HOURS WORKED ==>> 1
CONSULTANT NAME FOR S140  ALREADY STORED
Enter next case # below
ENTER  CASE #  ==>> 0
FOR MORE UPDATES ENTER <C> ELSE ENTER <Q>  ==>>  c
-------------------------------------------
!SELECT ONE OF THE FOLLOWING UPDATE CODES!
!<A> For case DATES update                !
!<B> For HOURS and closing DATE updates   !
!<C> For deleting a CASE                   !
!<D> For SECOND PHASE of entering data     !
!<E> For other info updates on a CASE      !
!<F> For case SIC # and description        !
-------------------------------------------
ENTER UPDATE CODE  ==>> c
------------------
ENTER THE CASE TO BE DELETED
```

```
----------------------------
ENTER  CASE #  ==>> 7777
ENTER <V> TO VALIDATE CASE #  ==>> v
CASE # 7,777 IS DELETED
FOR MORE UPDATES ENTER <C> ELSE ENTER <Q>  ==>>  c
-----------------------------------------
!SELECT ONE OF THE FOLLOWING UPDATE CODES!
!<A> For case DATES update               !
!<B> For HOURS and closing DATE updates  !
!<C> For deleting a CASE                 !
!<D> For SECOND PHASE of entering data   !
!<E> For other info updates on a CASE    !
!<F> For case SIC # and description      !
-----------------------------------------
ENTER UPDATE CODE  ==>> a
ENTER  CASE #  ==>> 8888
ENTER <V> TO VALIDATE CASE #  ==>> v
***********************************
*ENTER ONE OF THE FOLLOWING       *
*<1>  TO    ENTER OPENIND DATE    *
*<2>  TO    ENTER CLOSING DATE    *
***********************************
ENTER WHICH CASE DATE TO MODIFY  ==>>  2
-----------------------------------
!THIS CASE HAS BEEN CLOSED         !
!YOU ARE CHANGING THE CLOSING DATE !
!OF AN ALREADY CLOSED CASE         !
!ENTER CLOSING DATE                !
-----------------------------------!
ENTER MONTH ==>> 8
ENTER DAY  ==>> 15
ENTER <Y> FOR MORE CASE COMPONENT UPDATES ==>>  n
FOR MORE UPDATES ENTER <C> ELSE ENTER <Q>  ==>>  c
-----------------------------------------
!SELECT ONE OF THE FOLLOWING UPDATE CODES!
!<A> For case DATES update               !
!<B> For HOURS and closing DATE updates  !
!<C> For deleting a CASE                 !
!<D> For SECOND PHASE of entering data   !
!<E> For other info updates on a CASE    !
!<F> For case SIC # and description      !
-----------------------------------------
ENTER UPDATE CODE  ==>> b
***********************************
! This  procedure updates          !
! HOURS and closing DATE.          !
! To quit this procedure           !
! enter <0> for CASE #.            !
***********************************
ENTER  CASE #  ==>> 5555
ENTER <V> TO VALIDATE CASE #  ==>> v
ENTER CURRENT HOURS WORKED ==>> 2
```

```
ENTER <Y> IF CASE BEING CLOSED ==>>  n
ENTER  CASE #  ==>> 0
FOR MORE UPDATES ENTER <C> ELSE ENTER <Q>  ==>>  c
-----------------------------------------
!SELECT ONE OF THE FOLLOWING UPDATE CODES!
!<A> For case DATES update               !
!<B> For HOURS and closing DATE updates  !
!<C> For deleting a CASE                 !
!<D> For SECOND PHASE of entering data   !
!<E> For other info updates on a CASE    !
!<F> For case SIC # and description      !
-----------------------------------------
ENTER UPDATE CODE  ==>> e
ENTER  CASE #  ==>> 8888
ENTER <V> TO VALIDATE CASE #  ==>> v
!-------------------------------------!
! ENTER ONE OF THE FOLLOWING OPTIONS  !
!<1> TO ENTER CASE NAME               !
!<2> TO ENTER CONTACT NAME            !
!<3> TO ENTER PRE-VENTURE-STATUS      !
!<4> TO ENTER CASE ADDRESS            !
!<5> TO ENTER CASE TELEPHONE          !
!<6> TO ENTER SALES AND # OF EMPLOYEE !
!<7> TO ENTER CASE SEX                !
!<8> TO ENTER CASE MINORITY STATUS    !
!<9> TO ENTER CASE VETERAN STATUS     !
!-------------------------------------!
ENTER WHICH CASE INFO DATA TO BE CHANGED ==>> 6
ENTER CASE SALES  ==>> 20000
ENTER CASE NUMBER OF EMPLY ==>> 2
ENTER <Y> FOR MORE CHANGES ABOUT THE SAME CASE ==>> n
FOR MORE UPDATES ENTER <C> ELSE ENTER <Q>  ==>>  c
-----------------------------------------
!SELECT ONE OF THE FOLLOWING UPDATE CODES!
!<A> For case DATES update               !
!<B> For HOURS and closing DATE updates  !
!<C> For deleting a CASE                 !
!<D> For SECOND PHASE of entering data   !
!<E> For other info updates on a CASE    !
!<F> For case SIC # and description      !
-----------------------------------------
ENTER UPDATE CODE  ==>> t
*** ERROR IN UPDATE CODE ***
FOR MORE UPDATES ENTER <C> ELSE ENTER <Q>  ==>>  q
EXIT
```

3. **SAMPLE EXECUTION OF QUERY.CBL**

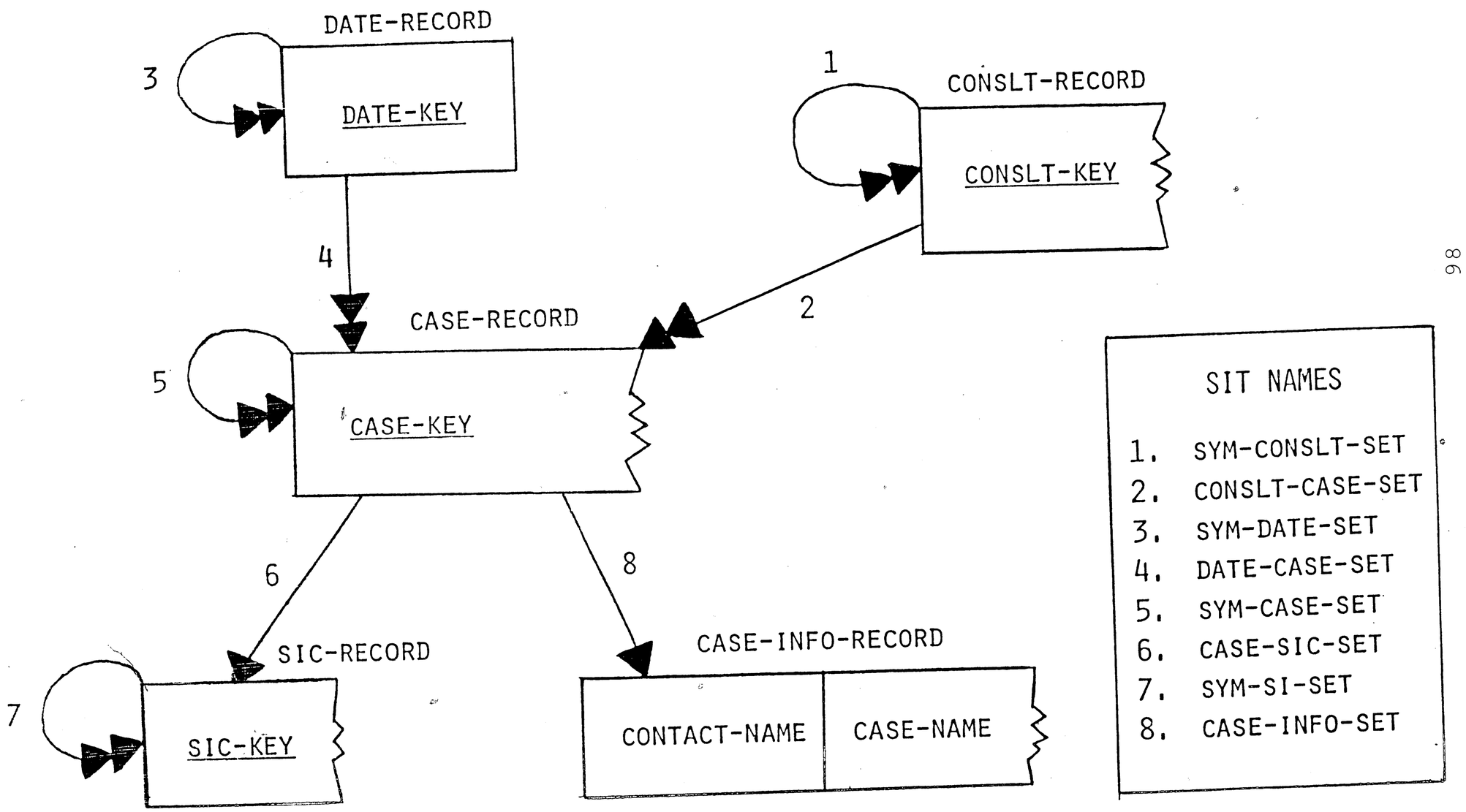
```
@exeCUTE (FROM) query.cbl
COBOL:  QUERY   [QUERY.CBL]
```

```
LINK:   Loading
[LNKXCT QUERY execution]

-----------------------------------------------
!   SELECT ONE OF THE FOLLOWING OPTIONS       !
!<A> For info between two given SIC # s        !
!<B> For information about a single case       !
!<C> For cases that are not opened yet         !
!<D> For consultant  information               !
!<E> For listing of a range of SIC`S under     !
!     a given TYPE of consultants              !
-----------------------------------------------

ENTER QUERY TYPE    ==>> A

ENTER FIRST SIC # ==>> 1200

ENTER SECOND SIC # ==>> 2600

FOR ANSWER TO THIS QUERY SEE APPENDIX A PAGE 1

FOR MORE QUERIES ENTER <C> ELSE ENTER <Q>  ==>>  C

-----------------------------------------------
!   SELECT ONE OF THE FOLLOWING OPTIONS       !
!<A> For info between two given SIC # s        !
!<B> For information about a single case       !
!<C> For cases that are not opened yet         !
!<D> For consultant  information               !
!<E> For listing of a range of SIC`S under     !
!     a given TYPE of consultants              !
-----------------------------------------------


ENTER QUERY TYPE    ==>> B

ENTER  CASE # ==>> 1144

ENTER <V> TO VALIDATE CASE # ==>> V

!---------------------------------------------!
!        SELECT ONE OF THE FOLLOWING          !
!<1> FOR CASE NAME, CONTACT NAME, DATE OPEN,  !
!    DATE CLOSED, HOURS, CONSLT #, SIC #      !
!<2> FOR CASE ADDRESS AND TELEPHONE           !
!<3> FOR CASE SEX,MINORITY,VETERAN AND        !
!        PRE-VENTURE STATUS                   !
!---------------------------------------------!

ENTER SINGLE CASE QUERY  ==>>  1
```

```
CONTACT NAME ------ SMICKER      RAY
CASE NAME --------- RAY SMICKER
CONSLT  # --------- E013
HOURS WORKED ------  10.50
SIC     # --------- 7395
SIC DESCRIPTION --- PHOTO LAB
SALES ------------- 0
# OF EMPLOYEE ----- 0
DATE OPENED ------- 04/14/83
DATE CLOSED -------   NOT CLOSED

ENTER <Y> FOR QUERIES ABOUT THE SAME CASE ==>>  Y

!-----------------------------------------!
!        SELECT ONE OF THE FOLLOWING      !
!<1> FOR CASE NAME, CONTACT NAME, DATE OPEN, !
!    DATE CLOSED, HOURS, CONSLT #, SIC #  !
!<2> FOR CASE ADDRESS AND TELEPHONE       !
!<3> FOR CASE SEX,MINORITY,VETERAN AND    !
!        PRE-VENTURE STATUS               !
!-----------------------------------------!

ENTER SINGLE CASE QUERY  ==>>  2

3391 S. 2ND ST.
WHITEHALL       PA 18052
  (215)644-6535

ENTER <Y> FOR QUERIES ABOUT THE SAME CASE ==>>  Y

!-----------------------------------------!
!        SELECT ONE OF THE FOLLOWING      !
!<1> FOR CASE NAME, CONTACT NAME, DATE OPEN, !
!    DATE CLOSED, HOURS, CONSLT #, SIC #  !
!<2> FOR CASE ADDRESS AND TELEPHONE       !
!<3> FOR CASE SEX,MINORITY,VETERAN AND    !
!        PRE-VENTURE STATUS               !
!-----------------------------------------!

ENTER SINGLE CASE QUERY  ==>>  3

FEMALE ? ----------------------  NO
MINORITY ? --------------------  NO
PRE-VENTURE ? -----------------  YES
VETERAN ? ---------------------  YES

ENTER <Y> FOR QUERIES ABOUT THE SAME CASE ==>>  N

FOR MORE QUERIES ENTER <C> ELSE ENTER <Q>  ==>>  C
```

LOGICAL SCHEMA

SMLBUS.CBL



SIT NAMES

1. SYM-CONSLT-SET
2. CONSLT-CASE-SET
3. SYM-DATE-SET
4. DATE-CASE-SET
5. SYM-CASE-SET
6. CASE-SIC-SET
7. SYM-SI-SET
8. CASE-INFO-SET

APPENDIX B:

PROJECTSEMAN DOCUMENTATION

KnowledgeMan

OPENING MENU

A. Enter New Client
B. Enter Existing Client
C. Print Menu
D. Edit Menu
E. Report Menu
F. AD-HOC Inquiries
G. Utilities Menu
H. Prepare Training Report
I. Prepare For Transfer
J. HELP 1062 Data-Base
K. EXIT 1062 Data-Base

ENTER CLIENT NUMBER - 70000

CASE RECORD

Client Number 70000 Quarter 0

SBDC Code __-___

Location Code ____

Date of Contact __-__-__

Name of Company _____

Name of Inquirer _____

Type Action

Pick One:

1-One Time
2-Initial
3-Follow-on
4-Follow-on Rel.
5-Admin. Closure
6-Change Clt. Info.
7-Change Cns. Info.
8-Delete Case
9-Delete Cns. Session

****

Address _____

Phone No. ___-___-____

City _____

State __

Zip Code _____

****

Stage of Firm's Business Life-Cycle

1. Pre-Venture
2. New
3. Mature
4. Liquidation

BUSINESS OWNERSHIP

Sex — Pick-One

1-Male
2-Female
3-Both

Ethnic Background — Pick One

0. Black
1. Puerto Rican
2. American Indian
3. Hispanic
4. Asian
5. Eskimo/Aleutian
6. Undetermined Minority
7. Other - Including White

Military Status — Pick One

1. Veteran
2. Vietnam-era Vet
3. Non-Veteran

BUSINESS INFORMATION

Type of Business 0 — Pick One

1. Retail
2. Service
3. Wholesale
4. Manufacturing
5. Construction
6. Other

Industrial Code

SBA Client — Pick-One

1. Borrower
2. Applicant
3. 8(a) Client
4. Surety Bond
5. COC
6. 8(a) & Borrower
7. 8(a) & Surety Bond
8. None

FINANCIAL DATA

****

	Dates Beg. - End	Gross Sales	Export Sales	Profit	No. of Emp. Full-T	Part-T	Owner Comp.
Before Cons.	__-__-_0 TO __-__-__	_____	_____	_____	____	____	_____
Follow-up Data	__-__-__ TO __-__-__	_____	_____	_____	____	____	_____

Resource Type

Pick One

1. Employee
2. Consultant
3. SCORE/ACE
4. SBI
5. Faculty
6. C. Contract
7. MAO
8. PROF/TR
9. Student
10. Other

****

ACTIVITY DATA

****

Contact Hours	Preparation Hours	Travel Hours	Counselor No.
__0.0	___._	___._	____

Counselor Name _____

****

Problems/Comments/Recommendations _____

Area of Counseling Provided

1. Bus. Start-up/Acquisition
2. Sources of Capital
3. Marketing/Sales
4. Government Procurement
5. Accounting & Records
6. Finan. Analysis/Cost Control
7. Inventory Control
8. Engineering, R&D
9. Personnel
10. Computer Systems
11. International Trade
12. Business Liquidation/Sale
13. Legal
14. Other

Additional Info. on File _____

Pick any Combination

0-None
1-Student Report
2-Financial Info.
3-Loan Package
4-Business Plan
5-Other

Jobs Created ___

Jobs Saved ___

Technology Based Firm ? (Y/N) _

International Trade Firm ? (Y/N) _

Procurement Case ? (Y/N) _

Incubator Client ? (Y/N) _

Outreach Client ? (Y/N) _

PRINT MENU

A. Print the Last 1062 Entered

B. Select a 1062 for Printing

C. Print all 1062's for a Case

D. Batch Print Menu

E. Return to "Opening Menu"

EDIT MENU

A. Edit the Last 1062 Entered

B. Select a 1062 for Editing

C. Return to Opening Menu

REPORT MENU

A. Prepare a Quarterly Statistics Report

B. Prepare an Activity Report

C.

D. Return to "Opening Menu"

UTILITY MENU

A. Rebuild SBDC1 Indexes

B. Rebuild SBDC2 Indexes

C. Rebuild All Indexes

D. Return to "Opening Menu"

MANAGEMENT TRAINING REPORT

SBDC Code: __-__0

Start Date: __/__/__

Ending Date: __/__/__

Total Hours of Training: __

LOCATION OF TRAINING

City/Town: _____

State: __

Zip Code: _____

NUMBER OF ATTENDEES

Total: ___0

Business Owners: ____

Minorities: ____

Women: ____

Veterans: ____

Vietnam Vets: ____

Disabled: ____

SBA Client: ____

TABLE - SBDC2

Primary Key (Composite): Case Number,Contact Date

FIELD NAME	DESCRIPTION
CASENUM	Case Number
ACTION	Type of Action
CONTDATE	Date of Contact
AREACNSL	Area of Counseling
RESTYPE	Resource Type
CONTHRS	Contact Hours
SUPPHRS	Support Hours
TRAVHRS	Travel Hours
CNSLTNUM	Consultant Number (Digits Only)
CONSNAME	Consultant Name
COMMENTS	Comments
CONSULT	Consultant Number (Letter and Three Digits)

TABLE - SBDC3

FIELD NAME	DESCRIPTION
SBDCCODE	Sub-Center Number
STRTDATE	Starting Date
ENDDATE	Ending Date
TRNTOTHR	Total Number of Training Hours
TRNCITY	City in Which Training Took Place
TRNSTATE	State in Which Training Took Place
TRNZIP	Zip Code
ATTTOTAL	Total Number of Attendees
ATTOWNER	Number of Attending Business Owners
ATTMINOR	Number of Attending Minorities
ATTWOMEN	Number of Attending Women
ATTVET	Number of Attending Veterans
ATTNAMVT	Number of Attending Vietnam-era Vets
ATTDSABL	Number of Attending Disabled
ATTSBACL	Number of Attending SBA Clients
TRNTOPIC	Training Topic
COSPSR1	Cosponsor - Score/Ace
COSPSR2	Cosponsor - SBDC
COSPSR3	Cosponsor - Other College/University
COSPSR4	Cosponsor - Jr. or Community College
COSPSR5	Cosponsor - Distributive Ed./Adult School
COSPSR6	Cosponsor - Chamber of Commerce
COSPSR7	Cosponsor - Trade or Professional Assoc.
COSPSR8	Cosponsor - Government Agency
COSPSR9	Cosponsor - PLATO
COSPSR10	Cosponsor - For-Profit Organization
COSPSR11	Cosponsor - SBA
COSPSR12	Cosponsor - Other
COSPNAME	Cosponsor's Name
PRGFORMT	Program Format
HISTORY	Unit History
VOLSCORE	Number of Score/Ace Volunteers
VOLOTHER	Number of Other Volunteers
ATTFEE	Attendee Fee

TABLE - SBDC1

Primary Key (unique): Case Number

FIELD NAME	DESCRIPTION
CASENUM	Case Number
SUBCTR	Sub-Center Number
LOCATION	Location Code
CNAME	Company Name
CONTACT	Contact Name
ADDRESS	Address
CITY	City
STATE	State
ZIP	Zip Code
LIFECYCL	Life-Cycle(ie. Pre-Venture, Mature, etc.)
FONE	Telephone Number
SEX	Male/Female
RACE	Ethnic Background
SBARELAT	SBA Relationship
VETSTATS	Veteran Status
INDCODE	SIC Code
BCDATE1	From - Before Counseling Date
BCDATE2	To - Before Counseling Date
BCGRSALE	Before Counseling Gross Sales
BCEXPSLE	Before Counseling Export Sales
BCPRLOSS	Before Counseling Profit/Loss
BCEMPFUL	Before Counseling No. of Full-time Employees
BCEMPPRT	Before Counseling No. of Part-time Employees
BCOWNCMP	Before Counseling Owner's Compensation
ACDATE1	From - After Counseling Date
ACDATE2	To - After Counseling Date
ACGRSALE	After Counseling Gross Sales
ACEXPSLE	After Counseling Export Sales
ACPRLOSS	After Counseling Profit/Loss
ACEMPFUL	After Counseling No. of Full-Time Employees
ACEMPPRT	After Counseling No. of Part-Time Employees
ACOWNCMP	After Counseling Owner's Compensation
TYPEFIRM	Type of Firm
MOREINFO	More Information
ADDJOBS	Number of Jobs Created
SAVEJOBS	Number of Jobs Saved

APPENDIX H:

Vita

VITA

NAME: Mehdi Hojjat

HOME ADDRESS: 1919 N. Troxell Street
Allentown, PA 18103

HOME TELEPHONE NUMBER: (215) 865-5632

WORK ADDRESS: Lehigh University
412 South New Street
Bethlehem, PA 18015

WORK TELEPHONE NUMBER: (215) 861-4630

DATA OF BIRTH: November 14, 1952

MARITAL STATUS: Married, 2 Daughters

PRESENT POSITIONS: Director, International
Trade Development Center
Adjunct Professor

OBJECTIVE

I would like to pursue my career in the area of finance and trade.

EDUCATIONAL EXPERIENCE

University of Tehran - B.A. in Accounting - Spring 1975.

The American University - Washington, D.C. - M.B.A. in Finance -
Spring 1978.

Lehigh University - Bethlehem, Pa. - Ph.D. in Finance - Areas of concentration : Economic Theories, Money and Banking, Finance, and Managerial Economics - Dissertation is written in the area of international portfolio diversification - Fall 1982.

American Graduate School of International Management - Thunderbird Management Center - International Trade Training Certificate Program - February 1986.

Lehigh University - M.S. in Industrial Engineering, Industrial Engineering Department - Fall 1987.

PROFESSIONAL EXPERIENCE

Adjunct Professor for Pennsylvania State University, Northampton Community College, and Lehigh University. I have been teaching courses in entrepreneurship, small business management, economics, international trade, and corporate finance.

Coordinator of International Trade Development Center/Data Base Manager (ITDC) for Lehigh University (September 1984 to present). Main responsibilities are to:

* Provide international trade **counseling**

* **Edit** and publish the International Trade Reporter, the newsletter of ITDC

* Develop an international trade **network** of government and private sector professionals

* Secure **funding** for the continuation of the program

* Conduct various international trade **seminars**

* Represent companies in international **trade shows** and foreign **trade missions**

As an **international trade specialist**, I've assisted manufacturers and high technology firms in developing and implementing export strategies which includes conducting international market research, evaluating firms resources, determining the mode of entry, advertising in targeted countries, identifying qualified contacts in foreign countries, and drawing agent/distributor agreements.

As a **data base manager**, I've been in charge of design, development and operation of four data bases.

Senior Research Analyst for Pennsylvania Small Business Development Center (August 80 to August 84). Responsibilities include:

* Analysis of acquisition and new ventures
* Business plan analysis
* Financial analysis
* Coordinating seminars
* Obtain Financing
* Conducting research

Accounting Analyst for the Export and Import Enterprise in Tehran (September 1972 to February 1975). Prepared monthly financial reports and operating performances for the company and its three satellites.

PAPERS AND PUBLICATIONS

Conference Paper, "Export Planning for Small Businesses". 32nd World Conference of International Council for Small. June 1987.

Article, "The World at Your Door", Networl, June 1987.

Booklet, Export Planning Guide, April, 1985.

Conference Paper, "Counseling Support and New Venture Formation", 30th World Conference of International Council for Small
Business" . Co-Author: John W. Bonge, June 1985.

Conference Paper, "International Portfolic Diversification" , PROCEEDINGS: International Congress on Technology & Technology Exchange, October 1984.

Working Paper, "Difficulty in Defining High-Technology Industries: Reviewing the Literature", February 1985.

Working Paper, "Innovative Output, Firm Size, and Industry Structure: A Review of the Current Literature". Co-Author: Tahereh A. Hojjat. May 1985.

Book (Contributing Editor), For Women: Managing Your Business, February 1983.